





















# Animal Keepers Forum

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July 1992

*Special  
Enrichment  
Issue*



*Dedicated to Professional Animal Care*

**Editor-In-Chief:** Susan Chan  
**Associate Editors:** Kayla Grams & Gretchen Ziegler

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## Information for Contributors

*Animal Keepers' Forum* publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm (6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKE. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31. FAX # is 913-272-2539.

### **DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH**

Articles printed do not necessarily reflect the opinions of the  
*Animal Keepers' Forum* editorial staff or the American Association of Zoo Keepers, Inc.  
Publication does not indicate endorsement by the Association.

Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.

This month's cover features a drawing of the magnificent Siberian tiger (*Panthera tigris altaica*) drawn by Janice Frazier, a primate keeper at the Pittsburgh Zoo. Largest of all the living felids, the Siberian tiger is Endangered and covered by an SSP. While zoos have had modest success breeding them in captivity, they remain extremely rare in the wild, with some believed to exist in northern China and Korea as well as the Amur-Ussuri region. They have thick, yellowish fur which lightenes to nearly white in the winter. Janice has drawn this protrait of their male, Shepis. Thanks, Janice!

## Scoops

and

## Scuttlebutt

### **AAZK Awards \$750 Research Grant**

The AAZK Research/Grants Committee proudly announces their award of \$750 to John A. Hnida, Research Technician, of the Dallas Zoo for his project entitled "Detection of Estrus in Gunther's Dikdik (*Madoqua guentheri*) Through Urinary Hormone Analysis". Congratulations, John!

AAZK offers two (2) grants, of \$750 each annually, to keepers interested in pursuing a specific zoo-related research project. Anyone interested in submitting a proposal should address their application requests to: Sue Barnard, Chairperson, AAZK Research/Grants Committee, Department of Herpetology, Zoo Atlanta, 800 Cherokee ave. SE, Atlanta, GA 30315.

### **Preakness Clean-up 1992 Report** - Submitted by Rosemary and Eric Krussman

Sunday, 17 May, marked the date for the Third Annual Preakness Clean-up in Baltimore, MD. It was the most successful effort to date! In the name of rain forest conservation, volunteers from the National Aquarium in Baltimore, the National Zoological Park, and the Baltimore Zoo recycled over 12,700 pounds of aluminum and generated over \$9,400.00. Funds from this event are donated to AAZK's Ecosystem Survival Plan through The Nature Conservancy. This year's funds are being used to add approximately 100 acres to the Talamanca Wildlands Corridor of La Amistad National Park in Costa Rica.

In further news from Baltimore.....The Conservation Parking Meter installed in the National Aquarium in Baltimore's rainforest exhibit last April, exceeded its \$50,000.00 mark over the Memorial Day weekend.

### **Bowling for Rhinos Update** - Submitted by Patty Pearthree, '92 BFR Chair

The Bowling for Rhinos fundraiser is going well again this year. Many Chapters have already held their events and money is currently being sent to the Ngare Sergoi Rhino Sanctuary.

Please send your Bowling for Rhinos money and financial form as soon as possible. If you are waiting for a few checks to come in, please send what you have with a note stating the amount you still need to collect. The Sanctuary really needs the money as soon as possible. Besides the trip to Africa prizes for the top two money raisers, we will now have prizes for the third through ninth highest money raisers. These will be bowling balls and bags donated by the Brunswick Corporation so we can thank more people for a job well done.

If you have any trouble with your event or money collection, please call me at (317) 322-8723.



## History Book Project Continues to Receive Support

The AAZK Board of Directors and History Committee Chair Rachel Rogers wish to thank the following individuals and Chapters who have donated funding towards the publication of the 25th Anniversary History Book: Robin Gilchrist, Spencer, OK; Pittsburgh Chapter AAZK, Pittsburgh, PA; and the Binghamton Chapter AAZK, Binghamton, NY. Many thanks!

## BOD Approves Three for Publications Funding Committee

The AAZK Board of Directors has approved the following individuals to serve on the Publications Funding Committee (PFC): David Luce, Chaffee Zoological Gardens of Fresno, Fresno, CA; Terri Maas, Philadelphia Zoo, Philadelphia, PA; and Karen Stern, Denver Zoological Gardens, Denver, CO. This committee will eventually consist of five individuals - four members and a committee chairperson. If you are interested in either serving as a member on this committee or would be interested in chairing this committee, please submit your resume and letter of interest to Rachel Watkins Rogers at the San Diego Zoo, P.O. Box 551, San Diego, CA by 15 August 1992.

The purpose of the PFC is to seek avenues of funding to offset costs of printing any of the publications undertaken by AAZK. These would include, but are not limited to, AKF, Conference Proceedings, Membership Directory, Diet Notebooks, etc.



# Notice to the Membership Proposed By-law Revisions

Please be advised that the following are the proposed changes to the AAZK By-laws. These By-law revisions will be put before the attending membership at the National Conference in San Diego this fall for ratification. If you have comments or questions on these proposed revisions, please direct them to AAZK President Ed Hansen at the Reid Park Zoo, Tucson, AZ. Please note that the revised portion of the By-law is shown here in italic typeface. Copies of the current By-laws (revised October 1991) to which these revisions are proposed are available from AO by sending a self-addressed, stamped legal sized envelope with your request.

**Article III, Section 2** - This Committee shall *solicit* nominees.... (second sentence)

**Article III, Section 3** - *The Committee chairperson shall cause to be distributed to each voting member a biographical sketch of each nominee, an official ballot and a pre-addressed balloting envelope, addressed to an independent accounting firm which will tabulate the election results. Voting members shall be defined as current dues paying Professional members, or Contributing or Life members who are eligible for Professional status, at the time the ballots are sent out. The voting member shall mark the official ballot and anonymously enclose the ballot, and only the ballot, in the pre-addressed balloting envelope. The balloting envelope may or may not include a return name and /or address. Upon receipt of the ballots, the accountants shall note their numbers and tabulate the results. If a voting member fails to receive a ballot, the member shall notify the Administrative Secretary, who shall cause a new ballot to be issued. Notice of a failure to receive a ballot must be made at least 21 days prior to the voting deadline.*

**Article III, Section 3a** - *The accounting firm shall notify the Chairperson of the Nominations and Elections Committee of the election results, who then shall...*

**Article VI, Section 10** - Treasurer. *The AAZK Board of Directors shall nominate and appoint a representative from either the current AAZK Board or an employee of the Association to serve in the position of Treasurer. The Treasurer...*

## By-Law Revisions, *Continued*

**Article VII, Section 9** - Allocation of funds. AAZK, Inc. shall be entitled to a percentage or fee from every conference delegate registration. This fee shall be set by the current AAZK Board of Directors. This fee shall apply to either national or regional conferences. AAZK, Inc. shall notify the host chapter one (1) year in advance of the conference date of the set fee or percentage. In addition, AAZK, Inc. shall be entitled to thirty-three percent (33%) of the total auction monies raised provided the host chapter realizes a profit from said conference.

**Article VIII, Section 9** - the period of Inactive Status will commence from the time a formal written petition is filed with the Administrative Offices of this Association and shall remain in effect for the period of one (1) year. Chapters will...

**Article VIII, Section 11a** - Willful violation....Article II, Section 8B of these By-laws.

## PROXY

(Professional and Affiliate Members Only May Vote - Membership status will be verified at Administrative Offices)

The AAZK Board of Directors and the AAZK By-laws Committee recommend the adoption by the membership of the following revisions to the By-laws of the Association. They will be voted on at the General Membership Meeting to be held at the San Diego Conference Sept. 27-Oct. 2, 1992. If you will not be in attendance, you may return this proxy ballot to let your wishes be known. CHOOSE ONE BELOW.

☐ I, the undersigned, do hereby designate Ed Hansen, President, as my Proxy at the 1992 General Membership Meeting of AAZK. I wish my vote to be cast with the majority of members in attendance at the General Membership Meeting.

☐ I, the undersigned, wish to vote against the following By-law revisions. (Please list below those revisions you wish to vote against.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_  
(Please Print)

Address \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

MAIL TO: PROXY BALLOT, AAZK Administrative Offices, 635 S.W. Gage Blvd., Topeka, KS 66606. Ballots must be postmarked no later than 15 September 1992.





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# Births & Hatchings



**Milwaukee County Zoo (Milwaukee, WI)**...announces the following significant B&H from 1 January through 31 March 1992:

**Mammals** - 0.01 Western lowland gorilla (*Gorilla gorilla gorilla*) (E/SSP); 0.1 Greater kudu (*Tragelaphus strepsiceros strepsice*) (U); 1.0 Vampire bat (*Desmodus rotundus*) (54th birth at MCZ); 0.01 Ruwenzori long-haired fruit bat (*Rousettus lanosus*) (U).

**Birds** - 0.03 Humboldt penguin (*Spheniscus humboldti*) (E/SSP); 1.0 Rothschild's/Bali mynah (*Leucopsar rothschildi*) (E/SSP). submitted by Wayne J. Hazlett, Chapter Liaison, MCZ AAZK.

**Los Angeles Zoo**...reports the following significant B&H:

**Mammals** - 0.02 Black howlers (*Aloutta caraya*) [E/U]; 0.1.1 Tufted capuchin (*Cebus apella*) [E] - [female is first birth for that pair, but was rejected and is being hand-raised]; 0.01 Golden-headed lion tamarin (*Leontopithecus rosalia chrysomelas*) [E/U] - [first offspring to new pair, first to this male at the L.A. Zoo]; 1.1 Snow leopard (*Panthera unica*) [E/SSP]; 0.1 Spekes gazelle (*Gazella spekei*) [U/SSP]; 1.0 Bushbuck (*Tragelaphus scriptus*) [U]; 0.1 Black duiker (*Cephalophus niger*) [U] - [first birth to this pair].

**Birds** - 0.0.4 California condors (*Gymnogyps californianus*) [E/ U]

submitted by Debbie Levy, Chapter Liaison, L.A. AAZK Chapter, Los Angeles, CA.

**Jackson Zoological Park (Jackson, MS)**...announces the following significant B&H for September 1991 through April 1992:

**Mammals** - 1.2 Cheetahs (*Acinonyx jubatus*) [E/SSP]; 0.2 Clouded leopard (*Neofelis nebulosa*) [S/SSP]; Pygmy hippo (*Choeropsis liberiensis*) [first birth in exhibit]; Giant anteater (*Myrmecophaga tridactyla*) [U].

**Birds** - 0.0.2 Black-necked swan (*Cygnus melanocoryphus*) [first hatch for pair]. Submitted by Kelly Creamer, Jackson Zoo, Jackson, MS.

**Zoo Atlanta (Atlanta, GA)**... announces the birth on 28 March 1992 of a 1.0 Sumatran tiger (*Panthera t. sumatrae*) [E/SSP] [first surviving cub of species at institution; rejected by mother at 5 days; being hand raised by staff]. submitted by Michelle R. Schireman, Zoo Atlanta AAZK Chapter Liaison.

**Hogle Zoological Gardens (Salt Lake City, UT)**...announces the following significant B&H at their institution:

**Mammals** - 1.0 Cotton-top tamarin (*Saguinus oedipus*) [first surviving offspring from pair]; 0.0.1 North American porcupine (*Erethizon dorsatum*) [first-time birth -- surprise--we house no male--female apparently received "wild" nighttime visitation]; 2.1 Serval (*Felis serval*) [E]; 1.1 African crested porcupine (*Hystrix cristata*) [first twin birth]; 0.1 Harbor seal (*Phoca vitulina*) [first mother-reared]; 1.0 Bactrian camel (*Camelus ferus bactrianus*) [E/SSP]; 0.0.1 African hedgehog (*Erinaceus algiriensis*) [first surviving offspring from wild-caught stock--husbandry change].

## **Births & Hatchings, Continued**

**Birds** - 0.0.1 Bald eagle (*Haliaeetus leucocephalus*) [E] [first time hatch from pair - fledgling released in Arkansas]; 0.0.2 Spur-wing plover (*Hoplopterus spinosus*) [first time hatch].

**Reptiles** - 0.0.1 Desert tortoise (*Gopherus agassazi*) [E].

**Invertebrates** - 0.0.87 Chilean rose-haired tarantulas (*Grammostola cala*).

--submitted by Marj Jones, Utah Chapter AAZK

**Lion Country Safari (West Palm Beach, FL)**...reports the hatch of a Cinerious vulture (*Aeopyius monachus*) [T/U]. This egg, the fifth laid at the facility, was artificially incubated. --News Release

**Sacramento Zoo (Sacramento, CA)**..announces the birth of 2.0 North American river otters (*Lutra canadensis*) [first birth of this species at the facility - being mother-raised].  
--News Release

Code: [E] Endangered  
[SSP] Covered by Species Survival Plan

[T] Threatened  
[U] Unusual in Captivity



## **Coming Events**

### **1991 Annual Conference of the Association of Avian Veterinarians (AAV)**

September 1-5, 1992

New Orleans, LA

For complete registration and program information, contact AAV Conference Office, 1625 So. Birch St., Ste. 106, Denver, CO 80222, (303) 756-8380, FAX (303) 759-8861.

### **3rd International Symposium on the Use of Ozone in Aquatic Systems**

Sept. 8-11, 1992

Greenwich, CT

Will focus on the holding, rearing and maintenance of marine and freshwater animals or plants in life support systems utilizing ozone. Sponsored by the International Ozone Association, the New York Aquarium and Osborn Laboratories of Marine Sciences. For additional information and to register please contact: International Ozone Association, 83 Oakwood Ave., Norwalk, CT 06850 Phone (203) 847-8169.

### **International Marine Animal Trainers Association 20th Annual Conference**

November 1-6, 1992

Freeport, The Bahamas

For a packet containing further registration information, including travel, car rental, hotel, etc. please contact: Vic Charfauros, Vice Pres/IMATA, c/o San Diego Zoo, P.O. Box 551, San Diego, CA 92112 USA.







## DOWN UNDER

By  
Judie Steenberg, Keeper  
Woodland Park Zoo  
Seattle, WA

DOWN UNDER.....is an information column about Australasian animals. While there are a number of Keepers who work in Australasian Units, or routines, oft times a Keeper will have a few species

of animals from the Australasian zoogeographical region on their string or routine. It is hoped this section will contain information on birds, mammals and reptiles.

This column is intended to:

- share experiences and information to improve the care and management of Australasian animals.
- seek information and advice on problems that occur.
- serve as a forum through which to make comment, to ask questions, to critique, or to verify information.

Please send your materials (a question, a paragraph or an article) directly to Animal Keepers' Forum, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606, Attn: Susan Chan.

## Australasia Rap Session '92

The Australasia Rap Session (ARS) has become a regular event at the AAZK National Conference, and this year it promises to be even more informative than ever. In addition to sharing ideas and information on Australasian species through presentations and discussions, there will be updates on the AAZPA meetings of the Monotreme and Marsupial Taxon Advisory Group (MMTAG), the Tree Kangaroo SSP, and highlights from the Dasyurid Symposium.

This year, as part of the ARS there will be discussion on how Keepers can help in the following areas:

- Collecting data for the AAZK Zoo Infant Development Project
- Providing husbandry data for AAZPA-MMTAG designated species
- Planning and coordinating future Australasia Rap Sessions

If you have a question for discussion or have a short presentation please let me know so we can add it to the agenda. Also, please advise if you would like to show slides, or video (VHS), and the amount of time you require. Contact: Judie Steenberg, Woodland Park Zoological Gardens, 5500 Phinney Ave. N., Seattle, WA 98103. Telephone (206) 684-4809 FAX (206) 684-4854.



# Conference '92 Last Call for Posters

The Papers and Workshops Committee invites AAZK members to consider this format for their presentations at the National Conference in San Diego (27 September through 2 October).

Posters will generally be accessible while other conference activities are underway, allowing them to be viewed at leisure during breaks. Whenever possible, poster authors can make themselves available to discuss their work informally.



## *Why do a poster?*

This style of presentation fosters direct exchange of information between conference participants, and provides further opportunities for professional colleagues to meet each other. Your fellow AAZK members may find it easier to ask detailed questions without the inhibitory effects of a larger audience or a strict schedule. More time also allows those who are most interested in the material to study it in depth and take careful notes. These factors allow presenters and their audience to achieve a level of communication not attainable in other formats.

Some subjects are simply better suited for posters than for other methods of presentation, particularly if they involve concepts which may be difficult to describe concisely but are easily conveyed in diagrams and photographs, or if most of the useful information consists of numbers in tabular form.

You may find that other more personal considerations influence your choice of format. Many people are not comfortable speaking to a large audience, but are completely at ease in one-on-one discussions. Doing a poster is an excellent way to test the waters, especially if this is your first conference and obtaining travel expenses is contingent on making a presentation.

Whatever your reasons for preferring a poster, a well-designed and carefully assembled presentation makes a positive and lasting impression.

## *To request inclusion in the Poster Session:*

Submit an abstract according to the instructions in the February 1992 *AKF* (p. 55). Under "A/V Equipment Needs" in the submission information list, write "Poster Presentation." Please note that the same deadline (July 31, 1992) applies.

Set aside enough time for assembly of your poster. Starting early allows for unexpected pitfalls, particularly if your graphic-arts skills are rusty.

Just as for papers and workshops, letters of notification will be sent for all abstracts accepted. A package of information on producing a poster, including many useful suggestions for layout and construction, will accompany the acceptance letter.

## AIRLINE DISCOUNTS

For the best available airfare, call Sundance Travel, Inc. at  
1 (714) 752-5456 or 1 (800) 424-3434 extension 195.

Look for special convention savings with Avis Rent a Car in your confirmation packet.

# PRE-CONFERENCE DETOURS

**Saturday, September 26, 1992 7:30 am-6:30 pm \$65.00 Per Person**  
**ALL DAY AT DISNEYLAND (11 hour activity)**

Welcome to the "Happiest Place on Earth!" Step into the exciting world of Mickey Mouse, Donald Duck, Roger Rabbit and the gang. Your group will have all day to ride the roller coasters, explore Tom Sawyer Island, experience Fantasyland, Tomorrowland, the Main Street Electrical Parade and more! There's much to experience in this magical world.

**Saturday, September 26, 1992 7:30 am-6:30 pm \$47.00 Per Person**  
**KNOTT'S BERRY FARM (11 hour activity)**

Knott's Berry Farm is a place with era's of excitement! You'll visit Ghost Town where the streets are lined with actual buildings from 100 years ago. You'll bump into frontier folks, scruffy prospectors, rough n' tumble gunfighters and beautiful can-can girls!

**Saturday, September 26, 1992 4:30-10:30 pm \$45.00 Per Person**  
**EVENING IN TIJUANA (6 hour activity)**

Just 17 miles south of San Diego is one of Mexico's largest cities, Tijuana. Today you will enter Tijuana, a friendly city with shopping unlike any other, where you will find great bargains on items such as leather, silver, onyx and tapestries. Your evening will include shopping, admission to reserved seating at the Jai Alai games, program, a margarita and dinner. An escort is provided on this trip.

**PAYMENT POLICY:** Full payment must be received no later than 15 days prior to your event. After that date, NO REFUNDS will be made. **Please mail your check and a self-addressed stamped envelope to the address listed below.** Your tickets will be mailed back to you. If Enjoy California Enterprises must cancel the tour due to lack of participants, a full refund will be made. Our tour escort will check your name off the sign-up list as you board the coach. Any available seats will be sold on a first come, first serve basis.

=====

## AMERICAN ASSOCIATION OF ZOO KEEPERS

Please send the completed form together with payment in full to:

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EVENING IN TIJUANA	_____ Tickets @ \$45.00 ea. = \$ _____

Name: \_\_\_\_\_ Phone: (    ) \_\_\_\_\_  
Address: \_\_\_\_\_  
City/State: \_\_\_\_\_ Zip: \_\_\_\_\_



# POST-CONFERENCE ADVENTURES

Just in case you still have some energy (and money) left after the best AAZK conference you have ever attended, we offer not one, but **two** post-conference "adventures".

## ADVENTURE #1: LAS VEGAS

- \* Three days, two nights
- \* Departure on Saturday, October 3rd with return on Monday, October 5th
  - \* Round trip airfare from San Diego
  - \* Round trip ground transportation
  - \* Deluxe Accommodations at the Maxim Hotel
  - \* All applicable taxes and gratuities

**\$169 per person based on double occupancy**  
**\$50 deposit per person by August 15, 1992**  
**Balance due 30 days prior to departure**  
**Cancellations after August 15, 1992 lose \$50 deposit**

## ADVENTURE #2: PUERTO VALLARTA, MEXICO

- \* Four days, three nights
- \* Departure on Saturday, October 3rd with return on Tuesday, October 6th
  - \* Round trip airfare from San Diego
  - \* Deluxe accommodations at the Buena Ventura Hotel
  - \* All applicable taxes and gratuities
  - \* All airport transfers

NOTE: Offered within the above dates is an optional one-day excursion, including a boat trip to secluded beaches for snorkeling and horseback riding to a remote waterfall. Approximate cost \$60. (Actual cost unavailable at presstime.)

**\$355 per person based on double occupancy**  
**\$50 deposit per person by August 15, 1992**  
**Balance due 30 days prior to departure**  
**Cancellations after August 15, 1992 lose \$50 deposit**

NOTE: All space is subject to availability. The San Diego Chapter of AAZK cannot be held responsible for last minute changes, bad weather or cancellations.

To book your post-conference adventure, contact:

Exceptional Travel Concepts  
5465 Morehouse Drive, Suite 100  
San Diego, CA 92121  
(619) 455-5552

**THE LAST MINUTE CHANGE IN POST-CONFERENCE DESTINATIONS FROM CABO SAN LUCAS TO PUERTO VALLARTA, MEXICO WAS DUE TO CIRCUMSTANCES BEYOND OUR CONTROL. HOWEVER, WE ARE CONFIDENT THAT YOU WILL HAVE AS GOOD, IF NOT BETTER TIME IN EXCITING PUERTO VALLARTA.**

# AAZK 1992 CONFERENCE AGENDA

## **September 26      Saturday**

Pre-Conference Trips (morning)  
    Disneyland  
    Knott's Berry Farm

Closed AAZK Board Meeting

Early Registration

Pre-Conference Trip (evening)  
    Tijuana, Mexico

## **September 27      Sunday**

Open Board Meeting

Registration

Ice Breaker

Cannibal Bar

## **September 28      Monday**

Welcome Breakfast

Paper Sessions

California Beach Party

Bar Hopping and Hospitality Suites

## **September 29      Tuesday**

Visit to the Wild Animal Park  
    Guided Monorail Tour  
    Workshops  
    Behind-the-Scenes Tours  
    Bird Show  
    Rare and Wild America Show  
    Guest Speaker  
    Lunch

Silent Auction

Andy Lodge and Anna Merz

Hospitality Suites

## **September 30      Wednesday**

Continental Breakfast

Paper Sessions

Visit to Sea World  
    Behind-the-Scenes Tours  
    Workshops  
    Dinner  
    Evening Shows

Hospitality Suites

## **October 1      Thursday**

Continental Breakfast

Paper Sessions

AAZK Business Meeting

Zoolympics on the Bay

Taco Bar

Live Auction

Hospitality Suites

## **October 2      Friday**

Awards Breakfast

Visit to the Zoo  
    Behind-the-Scenes Tours  
    Workshops  
    Guided Bus Tour  
    Special Speaker  
    Animal Shows

Final Banquet  
    Keynote Speaker  
    Dancing

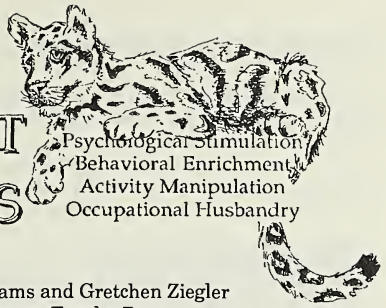
Hospitality Suites

## **October 3      Saturday**

Post-Conference Trips  
    Las Vegas, Nevada  
    Puerto Vallarta, Mexico



# ENRICHMENT OPTIONS



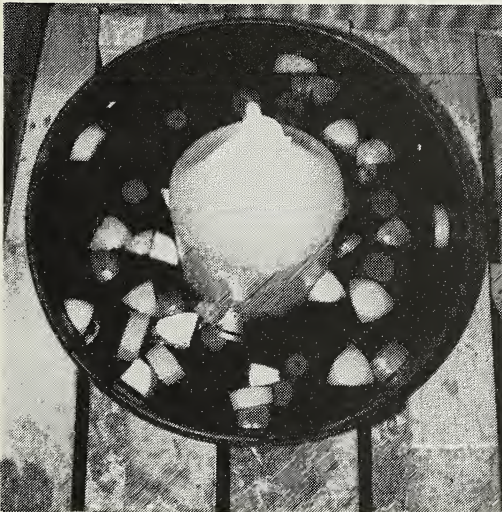
Psychological Stimulation  
Behavioral Enrichment  
Activity Manipulation  
Occupational Husbandry

by Kayla Grams and Gretchen Ziegler  
Keepers, Topeka Zoo

This month our column will feature some specific enrichment ideas that we enjoy using at the Topeka Zoo, as something different for our second dedicated issue, and because we are running low on material from our readers. (Hint, hint...)

During the hot summer month of August, our zoo hosts a highly publicized event called "Ice Day", when all the animals are given relief from the sweltering temperatures by huge blocks of ice set in their enclosures, and the visitors vicariously cool themselves by watching the animals play with the ice (and by eating the free ice cream). Two years ago, keepers got creative and invented new and exciting ways to present the ice to the animals. The following are a few of the ideas we have used for this event, and some have been so successful that we now use them throughout the year.

**ICE RINGS :** These are made using any size black rubber feed tub, filled with water, with some weighted container placed in the center of the tub. This can be a small bucket, a plastic jug, two liter bottle, etc. filled with water, rocks, or anything that will keep it firmly in place. Depending on the type of animal, things can be added to the water, such as chunks of fruit or vegetable, unsweetened Kool-Aid, a small amount of blood from the meat fed to carnivores. Once frozen, the middle container is removed, and the ring is suspended from or placed around a tree limb, etc. on exhibit. We have given variations of ice rings to oranges, gorillas, binturongs, macaques, gibbons, elephants (much bigger rings, of course), pumas, lynx, etc.

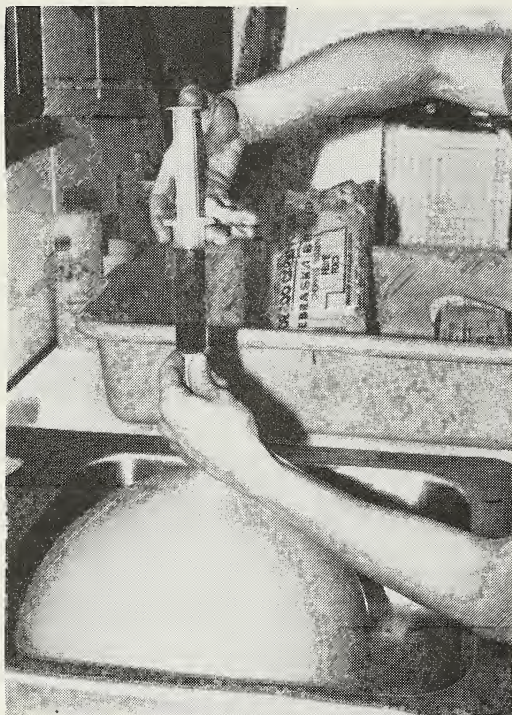


Pictured at left is a Kool-Aid flavored ice ring filled with fruit chunks. Plastic jug used as a weight to create center ring. Remove from freezer well beforehand, using care to extract center weight.

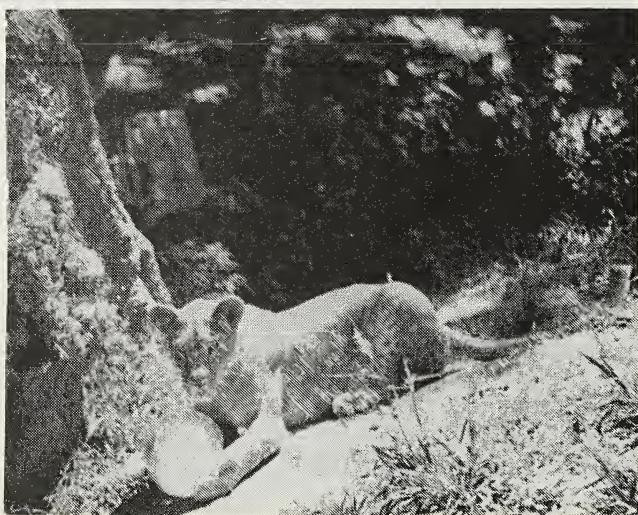


## **Enrichment Options,** *Continued*

**ICE BALLS:** Depending on the size of ice ball you want, use regular balloons, or punching balls. Fill these with water to desired size. Larger animals seem to prefer larger sizes. The balls can be plain ice, or they can also be flavored with Kool-Aid, or blood, and/or contain chunks of food. After filled, tie off balloon and freeze, making sure that the balloon stays as round as possible by placing in a tight container. Once frozen, remove the rubber balloon. These are enjoyed by carnivores and primates.



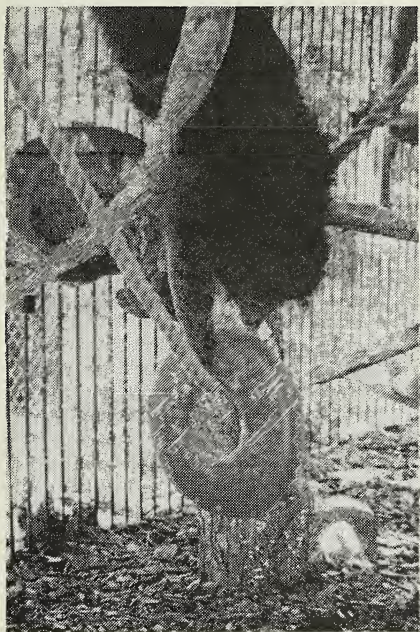
**At Left:** Punching ball filled mostly with water becomes a blood ball when a small amount of blood from Nebraska Brand® Frozen Feline is injected by a syringe into the filled balloon. Use enough blood to add flavor and smell to attract a cat. **Below:** African lion Nanyuki defends her blood ball after rolling it down the hill. The balls are licked until mostly melted.



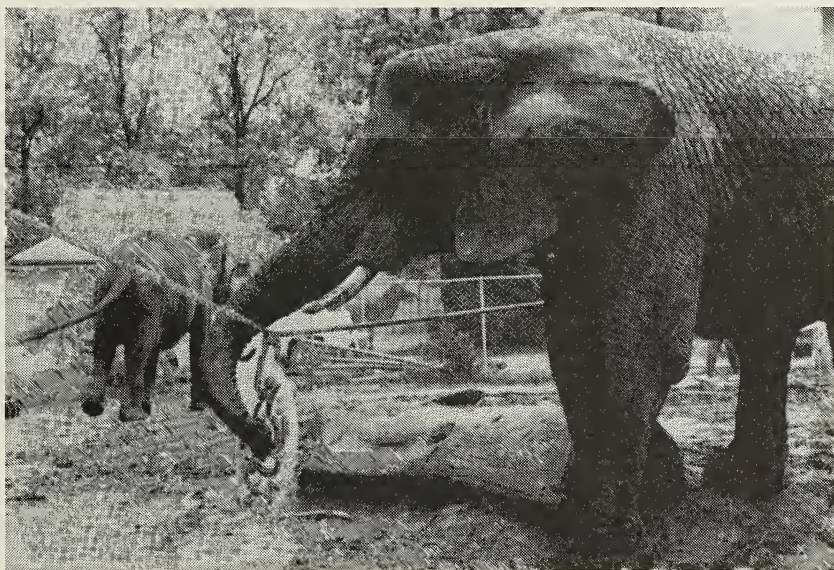


### **Enrichment Options,** *Continued*

Other ideas using ice include crushed, large ice blocks, ice cubes flavored or filled with food chunks, two liter pop bottles (topless) filled with food chunks or flavored, and any other shapes and sizes one can imagine.



**Left:** Marta, a female binturong, grabs the flavored ice ring from above. Below: female African elephant, Tembo, uses her trunk to investigate the treat-laden ice ring suspended from a rope in her outside yard.



# Legislative Outlook

*Compiled by  
Phyllis Nilson Wojcik  
AAZK Legislative Advisor*



The legislative advisor section of the Forum will continue to address legislation relating to both captive and wild animals, the environment, and regulations affecting zoos and zoo animals. As individuals working in the zoo field, we have a direct connection and responsibility to be alert to any legislation that may endanger the conservation of natural resources. There are three methods an individual uses to demonstrate his or her commitment to conservation: 1) Education (we, as zookeepers, do this daily); 2) Habitat Acquisition (Bowling for Rhinos and Ecosystem Survival Plan through the CPR Committee, but as individuals we are limited financially); and 3) Voicing our opinions - voting into office individuals with strong environmental support, and following up with correspondence to legislators, whether you voted them into office or not. We should write our Congress and Senate regarding particular legislation important to us. You can be sure big business is letting their voice be heard. So I encourage you to consider writing or calling your legislators in the coming months to express your opinion.

When writing be brief, limit your letter to one topic, give the bill number if possible, and request a reply from the legislator on how they stand on the issue. Include a return address.

Contact your Senator at: The U.S. Senate, Washington, DC 20510 or your Representative at: House of Representatives, Washington, DC 20515.

## Earth Summit Recap

The Earth Summit, history's largest gathering of world leaders, met for 12 days in June to attempt to solve environmental problems affecting the planet. The five principal documents discussed include:

Rio Declaration - A Non-binding statement of principles to guide environmental policy.

Statement of Forest Principles - A non-binding statement on protection of forests.

Agenda 21 - A non-binding, 800-page blueprint for action to protect the environment while encouraging development. Summit organizers say the plan would cost \$125 billion a year. The sole outstanding issue was a provision (opposed by Saudi Arabia, Kuwait and other major oil exporters) to encourage energy conservation and the development of alternative fuels.

Global Warming Convention - A legally binding treaty that recommends curbing emissions of carbon dioxide and other gases that can cause global warming.

Biodiversity Convention - A legally binding treaty to encourage protection of threatened plants and wildlife. A total of 150 countries had signed the treaty by the close of the summit. The United States, alone among the major powers, refused to sign.

The global warming treaty was signed by the U.S. only after pushing to remove deadlines and target levels for reducing carbon dioxide emissions. The U.S. alone produces 23% of the carbon dioxide emissions which trap the sun's heat and are considered a major cause of global warming.



The United States refused to sign the biodiversity treaty, claiming this would require additional U.S. aid to developing countries and harm our biotechnology industry.

These two treaties, although not perfect, will begin the momentum needed to address two very serious environmental concerns. The positive results of the conference will not be seen for many years, but with cooperation between industrialized and developing countries, we may be on the right path. --*excerpted from The Associated Press, June 14, 1992.*



## ***Publications Available***

### **Celebrities of Nature: Endangered & Selected Species of Florida (a Postcard Pictorial).**

This is a truly beautiful book which would make an excellent and thoughtful gift for a friend or for yourself. Its award-winning collection of twenty-two (5" x 7") full-color images captures the rare beauty and majesty of the vanishing species native to Florida. Each picture is a unique view of natural beauty captured in remarkable colorful detail by artist/photographer Alan S. Maltz. Each card also features valuable information about the species, its status in the wild, and reasons for its endangered or threatened status. Some of the species featured in this remarkable collection are: the Florida Panther, American Bald Eagle, the Key Deer, Bottlenose Dolphin, the Lower Keys Marsh Rabbit, the Osprey, Queen Conch, Florida Black Bear, Brown Pelican, American Alligator, Florida Manatee and Great White Heron. These photo postcards are not only great for mailing, but are suitable for framing. Selected images are also available in poster format. This work is printed on recycled paper and a portion of the proceeds go towards protecting endangered Florida wildlife. This fine collection is available for \$12.95 plus \$3.00 shipping from Light Flight Publications, 819 Peacock Plaza, Suite 620, Key West, FL 33040 or by calling (305) 745-2832. Also available is Mr. Maltz's first Postcard Pictorial - Key West Sunsets featuring dramatic sunsets from the Florida Keys and surrounding islands.

**Ecosystem Management: Rare Species and Significant Habitats.** The Proceedings of the 15th Annual Natural Areas Conference published through the New York State Museum. Edited by Richard S. Mitchell and Charles J. Sheviak, Biological Survey, N.Y. State Museum; and Donald J. Leopold, State University of New York, College of Environmental Science and Forestry. Topics included are: Old Growth Forest Preservation & the Spotted Owl; Integrated Conservation Strategies and Biological Diversity; Reintroduction of the Red Wolf; Kemp's Ridley Turtles and the Use of TEDS; Quantifying Rare Wetland Bird Habitat; Overviews of Natural Areas Law and Air Quality Designation to name a few. (314 pages [1990] illustrated, 8 1/2 x 11-inch format). Cost is \$24.95 per copy plus \$1.50 per book domestic shipping and \$2.50 per book for foreign orders. Order N.Y.S. Museum Bulletin 471. Mail to: New York State Museum, Publ. Sales - 3140 CEC, Albany, NY 12230.

**Suppliers of Beneficial Organisms in North America.** A new booklet for anyone looking for "good bugs" for their garden and farm. This 31-page booklet includes 95 suppliers of more than 126 different organisms used for biological control of pests. Includes names, addresses and phone numbers of sources of beneficial organisms throughout the U.S. and Canada, along with their product line, whether they sell wholesale or retail, and whether they have a catalog or brochure available. Also noted is whether they supply free information and consulting. Single copies are available free from the Department of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, Attn: Beneficial Organisms Booklet, 1220 N Street, P.O. Box 942871, Sacramento, CA 94271-0001. To order by phone, call (916) 654-1141.



## **Information Please**

We are looking for ideas for interactive/participatory exhibits (i.e. jump comparison between humans and various animals). These will be used to enhance the visitors' recreational and educational experience at the zoo. If you have any ideas please send a description or photo of the exhibit to: Kristi Flanders, Senior Keeper, Sedgwick County Zoo & Botanical Garden, 555 Zoo Blvd., Wichita, KS 67212.

## Little Rock Chapter Offers AAZK Logo T-Shirts and Sweatshirts

Sweatshirts in grey with black AAZK logo in M, L, and X-Lg. They are HANES 50/50 cotton/poly. Cost is \$15.00 plus \$3.00 shipping.

T-shirts in tan (sizes S, M, L and X-Lg) are also available from the Little Rock Chapter. They are 50/50 cotton/poly with the AAZK logo located on the left front pocket area of the shirt. The price per T-shirt is \$8.50 which includes postage.

Send order along with check or money order (U.S. FUNDS ONLY) to: AAZK Sweatshirt/T-shirt, Little Rock Chapter, Little Rock Zoo, #1 Jonesboro Drive, Little Rock, AR 72205. Checks or money orders should be made payable to "Little Rock AAZK Chapter".

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Please send \_\_\_\_\_ AAZK logo sweatshirt(s) in the sizes indicated below.

Medium \_\_\_\_\_ Large \_\_\_\_\_ X-Large \_\_\_\_\_

Please send \_\_\_\_\_ AAZK logo T-shirt(s) in the sizes indicated below.

Small \_\_\_\_\_ Medium \_\_\_\_\_

Large \_\_\_\_\_ X-Large \_\_\_\_\_

TOTAL ENCLOSED \$ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

# Sample Enrichment Bibliography

## Available from AAZK Reference Search

1. Avery, R.A. et al. Environmental Constraints on Lizard Foraging Behaviour. *Applied Animal Behaviour Science*, 18:383-390. 1987.
2. Clark, B. Environmental Enrichment: An Overview of Theory and Application for Captive Non-Human Primates. *Animal Keepers' Forum*. 18(8):272-282. 1990.
3. Cole, M. Examples of Tool Use in a Captive Group of Western Lowland Gorillas. Unpublished paper presented at the Annual Meeting of the American Society of Primatologists. 1989.
4. Hutchins, M. et al. Naturalistic Solutions to the Behavioural Problems of Captive Animals. *International Zoo News*. 188(31/6):11-27. 1984.
5. Markowitz, H. Behavioral Enrichment in the Zoo. Van Nostrand Reinhold Co. New York, NY. 1982.
6. Partridge, John. Little Things Can Mean So Much: Some Ideas for Environmental Enrichment. *International Zoo News* pp. 10-12, April/May 1990.
7. Shepherdson, David. Environmental Enrichment in the Zoo. Universities Federation for Animal Welfare. pp. 45-53. UFAW Courier No. 24. Herts., U.K., July 1988.
8. Shepherdson, David. The Application and Evaluation of Behavioural Enrichment in Zoos. *Primate Report* 22:35-42. 1988.
9. Shepherdson, David. Environmental Enrichment. *Ratel* Vol. 16(1): 4-9. February 1989. Association of British Wild Animal Keepers.
10. Shepherdson, David. Environmental Enrichment in Zoos, Part 1. *Ratel*, Vol. 16(2): 35-40. April 1989. Association of British Wild Animal Keepers.
11. Shepherdson, David. Environmental Enrichment in Zoos, Part 2. *Ratel*, Vol. 16(3): 68-72, June 1989.
12. Shepherdson, David. Stereotypic Behaviour: What is It and How Can It Be Eliminated or Prevented? *Ratel*, Vol. 16(4): 100-105. August, 1989.
13. Shepherdson, David et al. A Mealworm Dispenser for Meerkats. *International Zoo News*. pp. 16-19. April/May, 1990.
14. Westoby, M. What Are the Biological Bases of Varied Diets? *American Naturalist*. 112:627-631. 1978.

The AAZK Reference Search is a computerized database established to provide information on where to obtain sources of literature on specific topics of interest to zoo personnel. This reference search provides you with as complete a search as possible, and we are continuing to add to the database on an ongoing basis. This service is provided by the American Association of Zoo Keepers, Inc. as part of their Keeper Training and Education Committee, and is available to anyone in the zoo community for a nominal fee of 25 cents per page of print-out. The minimum charge is \$2.00 and you will be billed once the order has been placed. Marilyn Cole, Metro Toronto Zoo, is the Reference Search project head. If you would like an order form to request a reference search, send a stamped, self-addressed envelope to: Reference Search Form, AAZK, 635 Gage Blvd., Topeka, KS 66606.





# Enrichment Techniques for Elephants

By

Anita Schanberger, Tawny Carlson and Jerold Brown  
Animal Keepers, Phoenix Zoo, Phoenix, AZ

## Introduction

Enrichment techniques are an important component of the elephant management program at the Phoenix Zoo. Techniques are used to facilitate the daily husbandry procedures required to maintain their health in captivity and to help stimulate and encourage both mental and physical activity in an effort to alleviate boredom.

## Management

The Phoenix Zoo currently manages 0.1 Asian elephant (*Elephas maximus*) and 0.2 African elephants (*Loxodonta africana*). The Asian elephant, "Ruby", was born in Thailand and acquired at the estimated age of 7 months in February of 1974. The African elephants, "Kewana" and "Kinte", were acquired in 1982 at the estimated age of 3 years as a result of a culling operation in Wankie National Park, Zimbabwe.

The elephants are housed in a multi-species exhibit that includes 1.2 Blackbuck antelope (*Antelope cervicapra*), Guinea fowl and various domestic and wild waterfowl. The exhibit is approximately 0.48 hectares in area and includes a barn (15m x 9m), a pool (15m x 24m x 1.5m), and an elevated island (9m x 24m), that serves as a planter as well as a visual barrier for the animals. The entire exhibit is enclosed by a 3m high reinforced gunite wall that slopes outward at a 60 degree angle. Due to exhibit security and the compatibility of the animals, the elephants are not chained at night. The Phoenix climate also allows for the elephants to have open access to the barn and exhibit on a 24-hour basis throughout the entire year.

## Activities

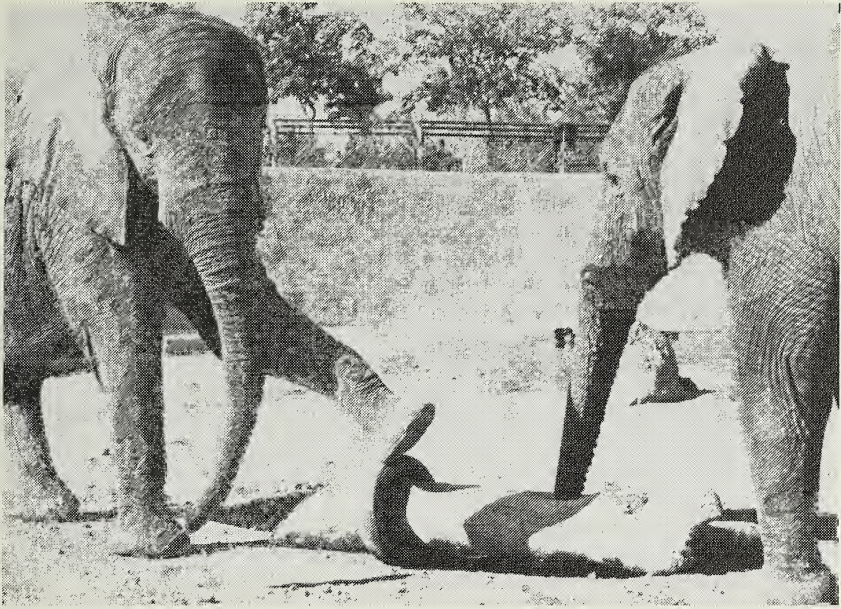
### Training

Elephant management procedures include daily training sessions which are intended to help promote the tractability required for general husbandry procedures such as bathing and foot care. The elephants respond to approximately 60 commands that allow for accessibility to any part of the body for health inspections and possible medical treatments. Tractability not only facilitates daily husbandry procedures but also allows for weekly collection of blood and vaginal cells for estrous cycle evaluation and participation in artificial insemination research.

### Dietary Enrichment

Some techniques which were designed to encourage activity without keeper interaction have proven quite effective. Food items such as fresh browse, carrots, apples, and alfalfa pellets are frequently scattered throughout the exhibit to encourage foraging behavior. Food items are also hidden underneath or in the crevices of logs to provide a food hunt challenge. The elephants have been noted spending a great deal of time trying to dislodge or uncover food items by lifting, pushing, or rolling logs in order to obtain hidden treats.

The elephants use their pool quite frequently, especially during the summer months, and methods are used that can be accommodated in the water. Buoyant food items such as apples and oranges are thrown into the pool resulting in a collecting challenge very similar to a "bobbing for apples" activity. Frozen food cubes are also provided and are made by freezing large rubber tubs filled with water and an assortment of fruits and vegetables.



**Female African elephant trying to pull a tire containing food items from a log. The other female African elephant is searching for food items that have been hidden underneath and in the crevices of the log. (Photo by A. Schanberger)**

### **Exhibit Furnishings**

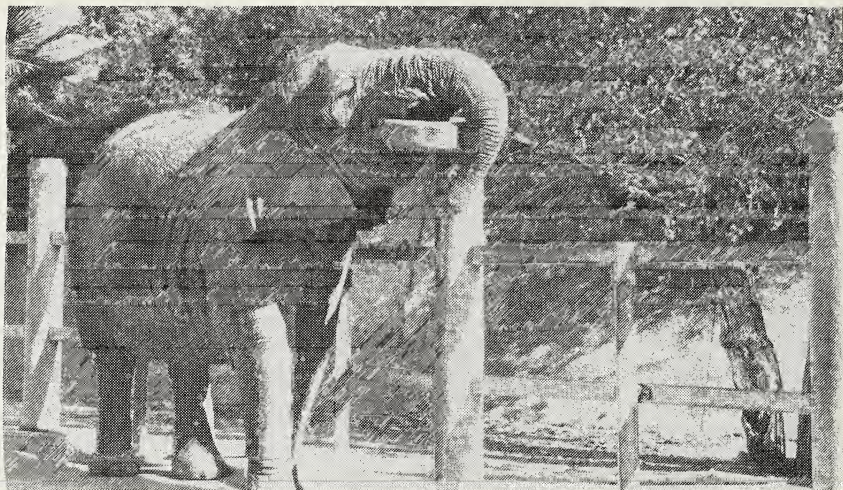
Occasionally changes are made in the exhibit to stimulate interest in the elephant's immediate surroundings. These changes may include the addition of tree stumps, the addition or replacement of logs, the provision of sand or dirt for dusting and large rocks for scratching, and the bulldozing of areas in the exhibit in which the substrate has become compacted.

Logs of various sizes are provided in the exhibit yard to encourage play activity. The elephants lift and carry the logs as well as demonstrate preferences for "favorite logs". Beltless tires of various sizes ranging from large tractor tires to small golf cart tires are also provided and have elicited a variety of behaviors including tossing and rolling. The elephants have been observed to stack the tires within each other according to size and to place tires on the post of guard rails inside the exhibit. Tires are also used as food hiding devices. Tires containing food are placed through logs of comparable diameter so that the tire has to be removed from the log to acquire the food reward, resulting in a manipulative challenge. One elephant has been observed spending up to 45 minutes trying to manipulate a tire off of a log in order to obtain the hidden food item.

### **Interactive**

Some activities involve both elephant and keeper participation. Kickball involves a large fiberglass ball and is sometimes used to encourage either individual or group participation with keepers. Soccer balls are also used as an interactive activity where keepers can either kick the ball directly to the elephants or the elephants can kick the ball to each other while keepers ride the elephants, acting as coaches.





The elephants have been observed placing tires through guardrail posts in the exhibit. This elephant is removing a tire containing food items that were intentionally placed through the guardrail post. (Photo by A. Schanberger)

### **Natural Behavior Enrichment**

There have been a few instances in which certain behaviors that were consistently noted resulted in experimental enrichment tools. One particular enrichment tool was the result of behaviors demonstrated by the Asian elephant. She has been observed tapping rocks on the bars inside the barn as well as scraping rocks across the grill of the exhibit yard drain. She has also been noted to tap rocks on different surfaces in the exhibit. These behaviors seemed to indicate her interest in producing different sounds, so an elephant-sized xylophone was designed to offer an opportunity for the elephants to experiment with various tones.

The xylophone is approximately 0.96m in length and consists of 10 steel plates ranging in size from 31.75 cm x 5.08 cm to 48.8 cm x 5.08 cm. These plate sizes were determined by experimentation to produce different tones for each plate. The steel plates were attached to a steel frame which was then permanently welded to an existing guardrail within the exhibit. The xylophone was designed to be inconspicuous and is hardly noticeable to the casual observer.

The Asian elephant showed considerable interest in the xylophone during the first few months after installation, using it more frequently when the African elephants were not in close proximity. She was noted to scrape rocks across the entire length of the instrument or to scrape just a few of the plates sometimes pausing to feel the plates after a sound was produced. The African elephants seemed more interested in touching the xylophone after tapping it with either their foot or a stick. Although the high interest level has diminished since it was initially installed, the xylophone remains a permanent fixture and is available to the elephants should they wish to interact with it. All of the elephants are still occasionally observed striking the xylophone with either sticks or rocks.

### **Painting**

This is another activity that was especially designed for the Asian elephant as a result of observations made on her behavior. She was noted to spend considerable time scraping rocks and sticks on the ground sometimes producing marks in the substrate. This behavior



## **Enrichment Techniques for Elephants,** *Continued*

was incorporated into a painting activity in an attempt to provide a behavioral enrichment for the elephant.

The development of the stick behavior into a directed painting activity was initiated in the spring of 1987. She was given the opportunity to familiarize herself with a paint brush and eventually exhibited the motions that had been previously observed with rocks and sticks. This behavior was encouraged and she was eventually provided with cardboard boxes on which to direct her makings. The boxes were gradually replaced with cardboard sheets that were held by keepers and eventually a portable easel was constructed to provide a more comfortable target.

The elephant is provided with a variety of brushes and a palette that provides 8 different nontoxic paints that included various colors. She is allowed to select the brushes and colors of her choice for each painting. She indicates the completion of the activity by refusing to select additional colors or by backing away from the easel. The average time spent on each painting is approximately 10 minutes.

Various behaviors have been observed during the painting sessions, including trunk-tipping, ear-wiggling, tail-raising, nipple-pulling, and cheek-patting. Vocalizations include squeals, chirps, humming, and very low rumbles that were heard as the skin on the elephant's forehead was visually noted to flutter.

These various behaviors and vocalizations have not been restricted to the activity itself, but have also been exhibited when the elephant sighted items associated with the painting activity including the easel, brushes, and paint containers. There have been instances when merely the spoken word "paint" or the name of a color have also elicited similar responses.

The various responses that have been observed during the painting sessions seem to indicate that the elephant enjoys the activity. Painting allows for keepers to participate with the elephant and it is believed that this positive interaction helps to strengthen the relationship between elephant and keeper. This activity is used as a behavioral enrichment tool for this particular elephant because of the continued interest demonstrated by the elephant.

The African elephants have been offered opportunities to paint, but they have not demonstrated the same level of interest as the Asian elephant. Their interest in producing marks with the materials provided has been limited and has primarily resulted in monochromatic strokes without any pattern of organization. It should also be noted that the African elephants have not demonstrated the same level of involvement in the stick scraping behavior as the Asian elephant. Continued opportunities to paint are offered when an interest to participate is observed.

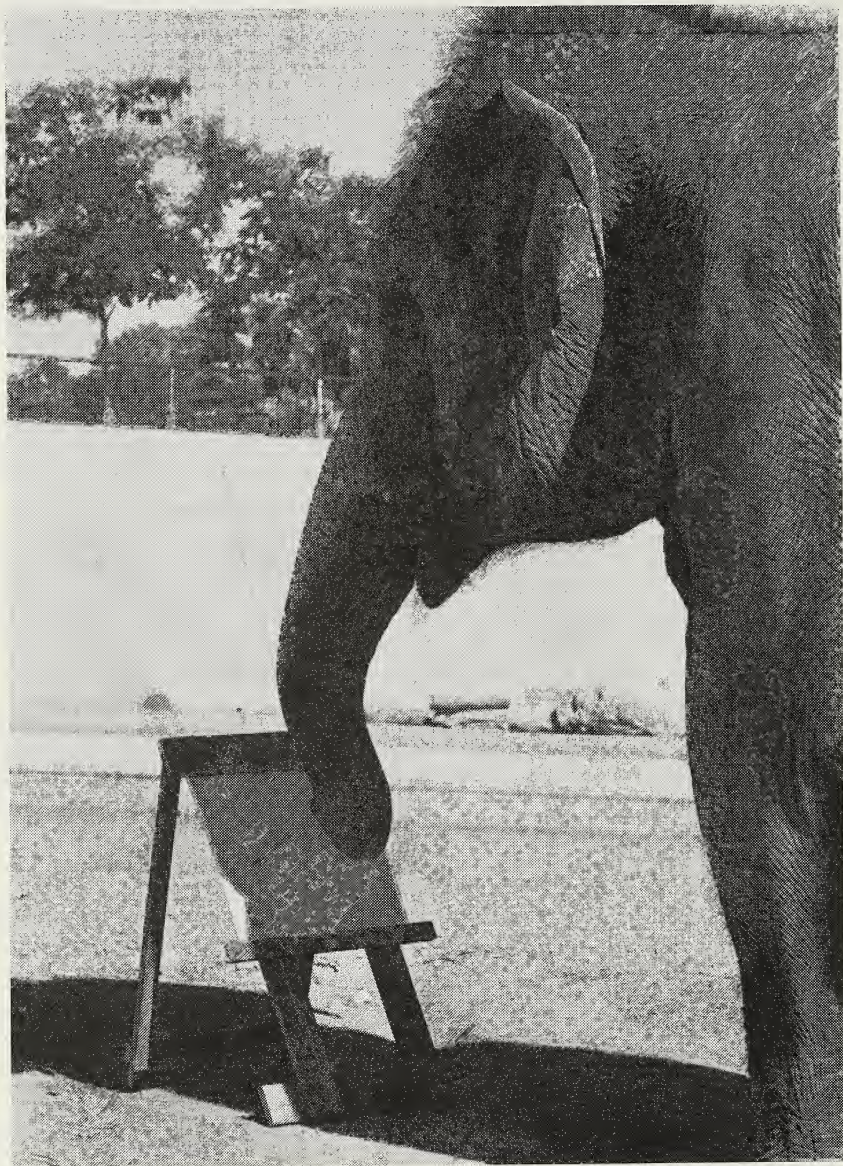
Several behavioral changes have been noted during the 4 years that the Asian elephant has been involved in the painting activity. Most of the paintings produced during the early stages were composed of smears, but as the activity progressed the paintings seemed to develop in composition with linear, triangular, and circular motions being noted. Utilization of space has ranged from complete coverage to selected areas of concentration. Attempts to encourage the elephant to use the entire canvas by manipulation have resulted in the continued painting in areas in which initial strokes were produced. Instances have also been noted in which marks were superimposed upon one another with the use of different colors of paint.

These behaviors seem to indicate what appears to be compositional control, visual orientation, and calligraphic development. The elephant's continued interest in the painting activity has led to an additional enrichment technique investigating her behavioral responses to a series of drawing experiments to determine possible tactile and visual awareness, visual organization, and compositional capabilities. These drawings are produced on a ground-level easel that was constructed for the elephant in an attempt to eliminate keeper interaction. The drawings are structured in a manner that allows for the



### Enrichment Techniques for Elephants, *Continued*

elephant to determine participation and selection of materials provided, and are conducted without any verbal praise or food reward. Preliminary observations indicate a strong interest to participate in the drawing experiments and many of the excited gestures observed during the painting sessions have also been observed during the drawing activities. The drawing experiment will be conducted as long as an interest to participate is demonstrated by the elephant.



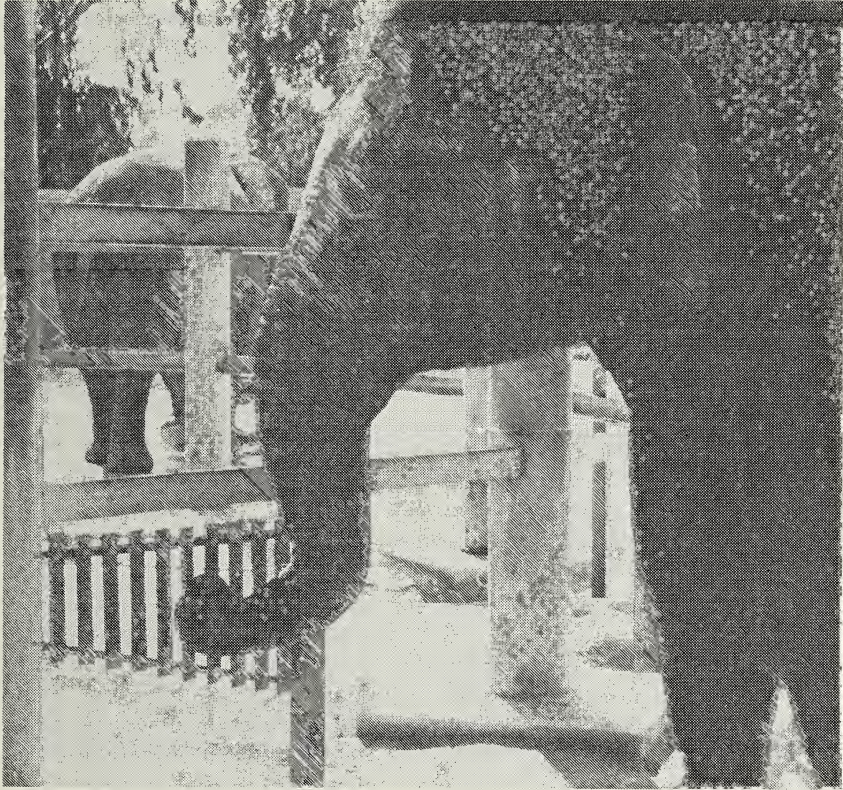
Female Asian elephant involved in a painting activity that was designed for her as a result of behavioral observations. Her continued interest in this activity has led to a series of drawing experiments to better understand the possible behavioral responses that may be reflected in her paintings. (Photo by Dick George, Phoenix Zoo)



## **Enrichment Techniques for Elephants, Continued**

### **Conclusion**

Enrichment techniques used for elephants at the Phoenix Zoo are intended to promote good health and to enhance the lives of these animals by generating both physical activity and mental stimulation. Techniques are designed to allow for basic husbandry procedures, the expression of natural behaviors, and the exploration of an individual elephant's interests and capabilities based upon behavioral observations. All of these aspects are considered in the continual challenge of providing additional enrichment techniques for these captive elephants.



**Female Asian elephant interacting with a xylophone that was designed for her as a result of behavioral observations. (Photo by A. Schanberger)**



### **HELP WANTED -COUGARS !**

The Exotic Feline Breeding Compound Chapter is seeking help putting together a 10-minute slide show dedicated to the Cougar for release at a fundraising gala in November. Proceeds are for the construction of a cougar natural habitat exhibit. Donations of one or more slides of cougars in the wild are especially sought, but any excellent slide is welcome. Pass the word! Send to: AAZK/EFBC Chapter, c/o EFBC, HCR 1, Box 84, Rosamond, CA 93560.



# Chapter News

## Bergen County Regional Chapter

The Bergen County Regional AAZK Chapter, which includes members from the Bergen County Zoological Gardens (formerly Van Saun Park Zoo), announces the adoption of their new logo (see below). It was designed by Chapter Vice President and Secretary Susan Nolan and features a Toucan. The Chapter plans to first use the logo on a banner to be displayed at Chapter-sponsored activities.



## Indianapolis AAZK Chapter

Hello from Indianapolis! Our Chapter is relaxing for a few weeks now that Earth Day, Bowling for Rhinos and Mother's Day is over. Both our Earth Day Booth and Mother's Day Bake Sale were successful, but our Chapter's biggest accomplishment was raising nearly \$10,000 for the Ngare Serengeti Sanctuary. Our Third Annual Bowling for Rhinos event was a lot of fun and went very well.

The top money raiser in our Chapter was Cara Lance who ran neck and neck until the very end with Patty Pearthree (last year's top BFR moneyraiser nationwide). Both of them as well as the rest of the Chapter are just happy to send as much money as possible to the Sanctuary. If anyone is interested, we still have some '92 Bowling for Rhinos T-shirts left.

--Maria McManus, Chapter Liaison

## Los Angeles Zoo AAZK Chapter

In spite of major civil unrest and a raging downpour, our First Annual Rhino Revelry was quite the event to behold. After all the numbers were crunched and the beans were counted, our head number-cruncher/bean-counter discovered that we had raised \$2,000 to donate to various rhino conservation organizations. The L.A. Chapter officers extend their sincere thanks to all those who participated and helped make Rhino Revelry a success.

--Debbie Levy, Chapter Liaison

## San Diego AAZK Chapter

May 16th marked the successful Third Annual Bowling for Rhinos, held this year at the Kearny Mesa Bowl. A total of \$6,000 was raised for the Ngare Serengeti Rhino Sanctuary in East Africa. Thanks to everyone who participated by bowling, baking goodies, helping event night, and donating raffle and silent auction items. A well-deserved thank-you goes out to Cindy Woodward who coordinated the whole event again this year, and who has a special place in her heart for the rhinos.

Also in May the Chapter was privileged to have Mr. Gary Priest, Animal Training Specialist for the Zoological Society of San Diego, speak at the monthly meeting held on the 27th.

Gary's lecture and presentation included two videos shown at last year's AAZPA conference on developing Animal Behavior Management Plans for routine maintenance, medical care and keeper safety. Five case studies utilizing operant conditioning were shown and included:

1. Routine Animal Management
  - a. potentially lethal animals, i.e. poisonous snakes.
  - b. supplemental bottle-feeding, i.e. Lion-tailed macaque mother not producing enough milk for her infant "Tambu".
2. Special Veterinary Care
  - a. "Loon", the diabetic Drill

## **Chapter News, Continued**

### **3. Research**

a. Cheetah Breeding Project and semen collection.

### **4. Environmental and Behavioral Enrichment for Bears**

a. utilizing the "cricket cannon", seed spreader and goldfish.

### **5. Keeper Safety**

a. "protective contact", i.e. elephant - developed by Tim Desmond

Impressive! Keep up the great work.

--Mary Dural, Chapter Liaison

## **National Zoological Park AAZK**

Our Chapter received \$1,000 as a result of the "Be Nice Twice" recycling program in effect at NZP. This project has not only effectively raised money, but it has also raised conservation awareness among NZP staff, FONZ staff and the general public.

The annual Preakness Clean-up earned \$9,500 this year allowing for the purchase of an additional 118 acres of rainforest in southern Costa Rica. This brings the total to 275 acres of land being permanently protected.

In response to a request received from Melba Shields, who left NZP a few years ago to join the Peace Corps, the Chapter has voted to purchase the AAZK Diet Notebook and some baby bottles. These items will be used for hand-rearing infant animals at a zoo in Uruguay where Melba is currently stationed.

--Kathy Kelly, Chapter Liaison

## **Zoo Atlanta AAZK Chapter**

The Zoo Atlanta Chapter has been busily preparing for the 1993 AAZK National Conference. Fundraising and planning are in full swing. The computer we recently purchased should help a great deal with organizing all of the particulars for this event.

Our Third Annual Bowling for Rhinos took place on Saturday, June 13th. We had a great showing from keepers,

management, docents and staff from every corner of the zoo!

We would like to wish the best of luck to two keepers who have left this spring: E. Glenn Goodman and Alicia Wade. You will both be missed!

--Michelle R. Schireman  
Chapter Liaison

## **Dallas AAZK Chapter**

This Chapter has also adopted a new logo during 1992. It was designed as a cooperative effort of a Chapter Patch Committee and features an Okapi, Hornbill and Lizard representing the three animal departments (mammal, bird and reptile) at the Dallas Zoo. The logo is surrounded by a Ndebele border - our 'Wilds of Africa' motif.



Serving on the Patch Committee were: Angela Yang, Elizabeth Pyle, Sue Averill, Mike Sanning, Dan Vitello and Teresa Harrington.

--Sue Averill

## **San Antonio Chapter AAZK**

Officers for 1992 are:

Acting President.....Terry Fisher  
Secretary.....Georganne Neubauer  
Treasurer.....Dimas Dominguez  
Chapter Liaison.....Antonio Garza

HOWDY ALL ! San Antonio Chapter used the past few months to prepare for Bowling for Rhinos. With Terry Fisher and Georganne Neubauer heading up the event and with San Pedro Bowling

## **Chapter News, Continued**

Center's strong support, over \$3,000 was raised.

Many thanks go out to our supporters. We will be awarding these special businesses, individuals and celebrities with our special "Oxpecker Award".

Also in the works has been our logo. We have adopted the Whooping Crane with the state outline. SAZ is the only zoo to display whoopers, and Texas is this species' natural wintering grounds. The Texas coast provides a rich food supply and an opportunity for visitors to view this rare bird.

Staff Veterinarian Mel Richardson has invited keepers to a monthly brown bag. This informal gathering over lunch provides everyone the opportunity to ask questions and discuss medical concerns. Dr. Richardson will also present interesting cases to the group.

We would like to thank Kim Hoskins,

the zoo's Special Events Coordinator, for giving a wonderful presentation on 'Costa Rica and the Zoo Conservation Outreach Group' for our May meeting. This has truly sparked our interest in becoming involved with this conservation program. John McLain, Curator of Reptiles and Fish, also deserves many thanks for his insightful lecture on conservation strategies during our June meeting.

We are now preparing to start our "Opportunity For Fun (O.F.F.) Adventure". Our 'adventure' is a fundraiser aimed at supporting the Chapter's activities. With the support of local restaurants, theaters and other businesses, our Chapter offers a drawing for 'a night on the town'. Last year we raised over \$500 in donations. This year, the money will be used to send Chapter members to the National Conference in San Diego.

--Antonio Garza, Chapter Liaison



## **AAZK Announces New Professional/Contributing Members**

Donna Mae Nelson, Queen's Zoo (NY)  
Jamie Bojan, National Zoo (DC)  
Anna Martineau, Silver Springs Wildlife Prk (FL)  
Richard V. Coscia, Silver Springs (FL)  
Buddy Cranston, Silver Springs (FL)  
Justin Lamb, Silver Springs (FL)  
Jennifer Saye, Silver Springs (FL)  
Carol Baron, Silver Springs (FL)  
Dena Mandino, no zoo listed (TN)  
Kevin Brenner, Mesker Park Zoo (IN)  
Joseph Cadigan, Henson Robinson Zoo (IL)  
Deborah Sharbaugh, Greater Baton Rouge Zoo (LA)  
Coleen Watkins, Caldwell Zoo (TX)  
Lisa Hendrickson, Hogle Zoo (UT)

Andrew Verhey, Staten Island Zoo (NY)  
Patricia Whiddon, private rehaber (VA)  
Chris Shaw Puleo, Silver Springs (FL)  
Roger Cranston, Silver Springs (FL)  
Erwin A. Reddick, Silver Springs (FL)  
Jeremy T. Setty, Silver Springs (FL)  
Julie Hader, Silver Springs (FL)  
David A. Hill, Miami Metro Zoo (FL)  
Robert Deranek, Potawatomi Zoo (IN)  
Teresa Mitchell, Mesker Park Zoo (IN)  
Daniel Ferguson, Henson Robinson Zoo (IL)  
Eddie Green III, Audubon Institute (LA)  
Mary Blythe Drysdale, Ft. Worth Zoo (TX)  
Camille Dorian, Monkey Manor (CA)

### **New Contributing Members**

Jane Truitt, Pet-Ag, Inc., Elgin, IL

### **Renewing Contributing Members**

Andy Lodge, Ngare Sergoi Support Group, Inc., Columbus, OH  
Kathy De Falco, Volunteer, San Diego Zoo, Escondido, CA





# An Occupationally Enriching Display for Our Black Bears (*Euarctos americanus*)

By  
James Bousquet, Director  
Walk-in-the-Wild Zoo, Spokane, WA

(Editor's note: This article was written while James Bousquet was Elephant Supervisor at the El Paso Zoo, El Paso, TX and therefore deals with the animals and exhibits at that facility.)

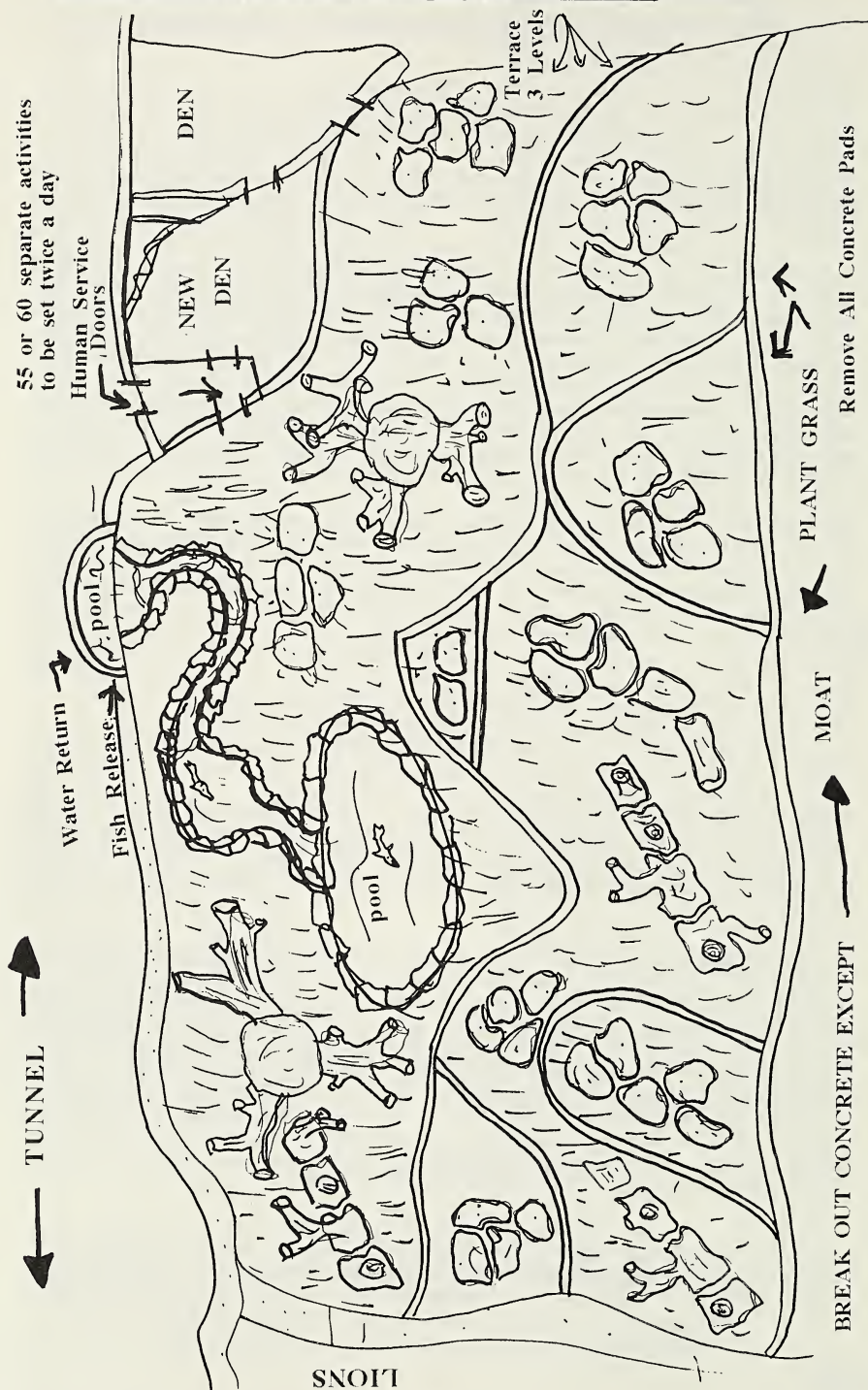
Bears (Ursidae) are still commonly displayed in enclosures void of any meaningful activities. They are intelligent resourceful animals that require lots of things to do. The Black bears (*Euarctos americanus*) we display are living in an occupational vacuum as well. Though they are not in my area, I was struck by their plight one day when I walked by their enclosure. They were lying in a pile of omnivore diet, too bored to get up, they merely flicked out their tongues to lap up their food. I thought to myself "This is an inventive, versatile omnivorous forager that spends many hours a day selecting and devouring a wide variety of foods. No one looking at these animals would know that." So I came up with a design which we can use in a soon-to-be-vacated display. When it is completed the Black bears will be moved in and the good times will begin.

The display we will use is fairly large and has three levels all covered with concrete. There is an adequate pool which only has to be naturalized. All of the concrete will be removed and artificial rock clusters and fallen trees will be installed which will be halved and connected with a hinge. Each rock and tree segment will have a food receptacle which the bears can reveal by turning over the tree or rock half. There will be a standing tree with food hollows that the bears can only reach by climbing. A stream with a live fish release site in the service isle will flow into the pool so that we can release this food treat at unsuspected times (See preliminary drawings). Of course, the display materials will have to be very durable to withstand the nonstop foraging behavior of the bears.

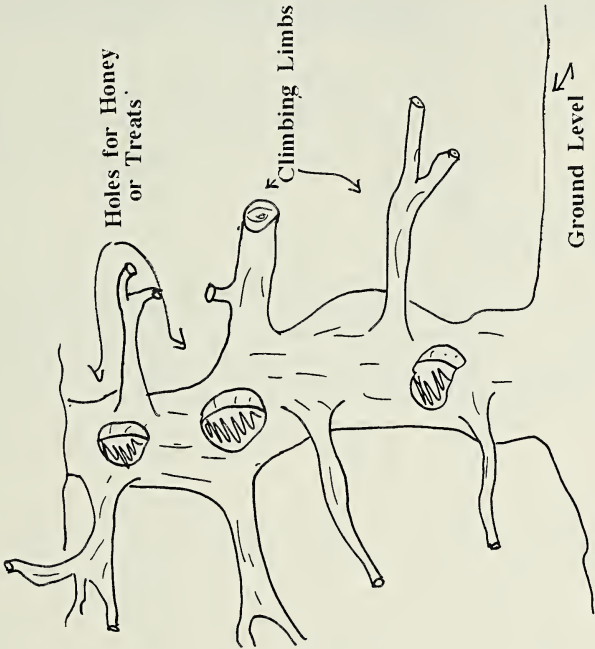
As shown in the drawings, there will be 55 or 60 separate food receptacles for the bears to open. All of them will be stocked with food at cleanup time in the morning and then they will all be stocked again after lunch. This will give the bears 110 to 120 separate food receptacle opening activities each day. It would be a lot of extra work, but I believe this sort of concentrated animal keeping is the future of animal care. We work hard for our animals' health so the animals can work hard and, above all, behave normally. Enrichment and occupational activities are where it is at in the 1990s and should be a top priority.

Providing things for our animals to do is not only healthy for our animals, it provides an excellent educational activity for our visitors. Remember the bears lying in the omnivore diet? There is nothing educational about that. Bears aren't really bears until they can act like bears. When they are digging, licking, grazing, climbing, swimming, fishing, etc. they are bears. They, as a species, are inseparable from their activities and people visiting the zoo should be made aware of it. (Behavior is defined as "how animals use their psychological and physiological adaptations"). So I plan to announce our feeding times so people can enjoy and learn about bears acting like bears. Colorful graphics about bears and bear activities would tie in nicely too. I have a cordless sound system which the Zoo Society bought for use in my elephant programs. I will use this to augment the feeding program if it goes well.

The Black bear, though common and commonly displayed, provides a storehouse of interesting activities which can be used to teach people about animals. But, then again, there are hundreds of common animals displayed in zoos which offer the same opportunity.

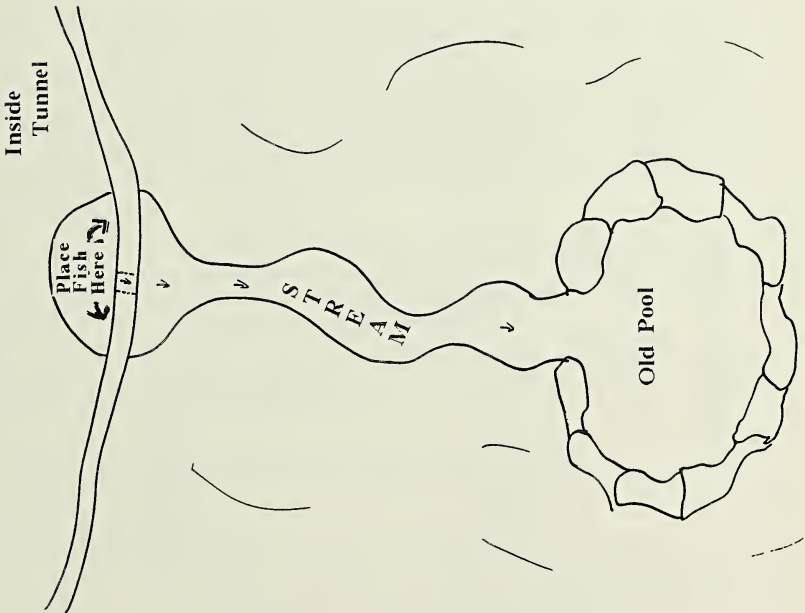


HONEY TREE



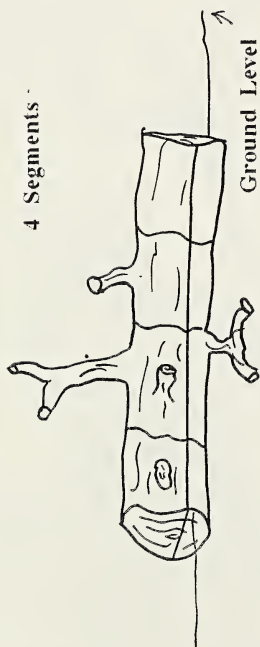
Real or Man-Made Tree

STREAM

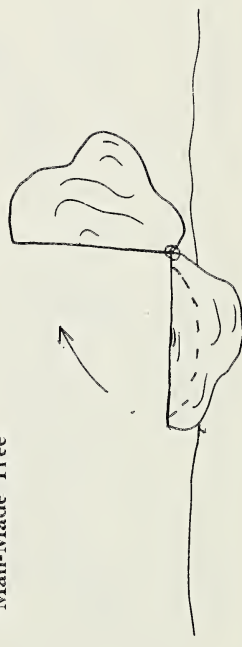




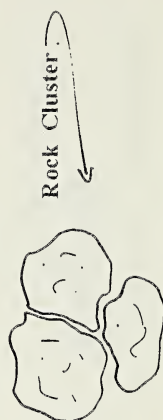
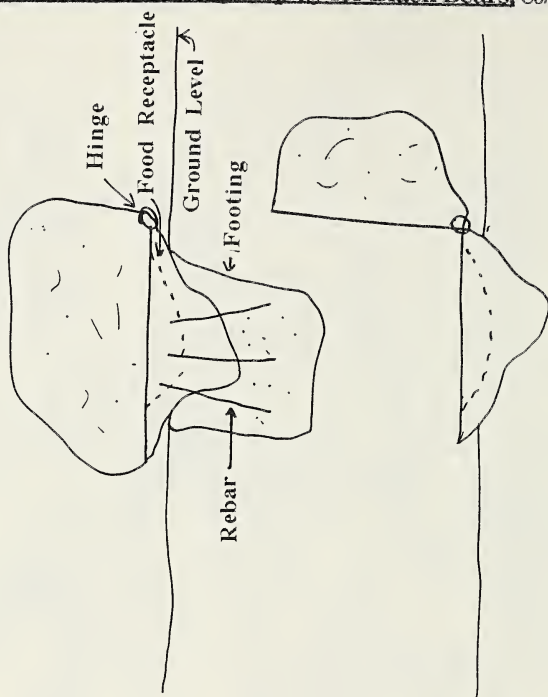
## FEEDING LOG



Can Be Real or  
Man-Made Tree



## FEEDING ROCK





# Book Review

## *Socioendocrinology of Primate Reproduction*

Edited by Toni E. Ziegler and Fred Bercovitch

Wiley-Liss, New York, NY

217 pgs. Hardcover Price: \$55.00

*Review by Kathy Ann Clark*

*Senior Zoo Attendant*

*Metro Parks Zoos, Boston, MA*

*Socioendocrinology of Primate Reproduction* is a series of papers that came about as the result of a symposium held by the International Primatological Society in 1988. Socioendocrinology, as defined by the editors in the introduction, is "...the study of the effects of the social environment on the interactions between hormones and behavior." One reason for the study of socioendocrinology is an attempt to understand how the social environment, hormones, and behavior affect the reproduction of individuals. Ziegler and Bercovitch also point out that socioendocrinology is a synthesis of many disciplines including anthropology, biology, behavior, sociology and endocrinology.

This book offers in its nine chapters perspectives of researchers who have studied behavior in primates ranging from prosimians to humans. The differences between prosimians, Old World primates, New World primates and great apes are discussed in the context of how these differences affect the scope and range of research into their behavior. Various common themes appear in the nine articles, providing a common thread of study and interest. Issues reviewed in the book include reproductive maturation, and the timing of menarche, the degree of menstrual cycle synchrony and suppression, the extent of intersexual influences on reproductive physiology, mechanisms affecting lactational delay of ovulation and status-related effects on neuroendocrine functioning.

The information included in *Socioendocrinology of Primate Reproduction* is presented in an accessible style and format. The book can be read and grasped by anyone with a fair knowledge and interest in primates, behavior and reproduction, yet will be stimulating and useful for more advanced students and scientists. Each chapter summarizes research on the subject matter to date, as well as new information, and further suggestions for new research. The book is stimulating because it is groundbreaking and because it is a synthesis of various disciplines and perspectives. Socioendocrinology will provide a link between evolutionary biology and the ultimate causes of behavior with the proximate causes put forth by endocrinologists.

The book would be useful for keepers and other professionals in the zoo field because of the questions and answers raised about factors that affect reproduction of captive primates. The various authors will be well-known to students of primate behavior, including Ronald Nadler, Charles E. Graham, Robert Goy and M. Kay Izard.

In conclusion, I found this to be a valuable, interesting and important book. I would recommend it to keepers and others interested in the subject matter. The book is a good reference, well-written and thought-provoking.

## *Primate Origins and Evolution. A Phylogenic Reconstruction*

By Robert D. Martin

Princeton University Press 1990

804 pgs. Hardback Price \$125.00

*Review by Michael Seres*

*Yerkes Primate Research Center*

*Field Station, Emory University*

*Lawrenceville, GA 30242*



## Book Review, Continued

I was privileged to attend and listen to Professor Martin's closing lecture at the XIIth Congress of the International Primatological Society held in Brasilia, Brazil in 1988. Using two slide projectors, he gave an unforgettable presentation, speaking plain English about the topic of primate origin and evolution. A task otherwise dry and full of technical terms was transformed so that even a high school student could easily follow it. It amazed and very much amused me. I learned so much during his almost two-hour presentation; more than during the past couple of years of trying to understand the fundamental and basic issues of the evolution, origin, and relationships of monkeys, prosimians and apes.

When Professor Martin's present book, Primate Origins and Evolution was published, I called the publisher to order a copy, but my jaw dropped when I heard the price. Obviously, I had to "postpone" the purchase. It was hard to face the reality that my interest in primate evolution as a zookeeper far exceeds the contents of my wallet. Thanks to the Book Review program of the AAZK, I consider myself lucky to own a copy of this outstanding piece of work. What about colleagues in my "category" with similar interests in zoos? Am I the only crazy one who attempts to buy an expensive, painstakingly detailed book such as this? Perhaps, but I honestly doubt it. The price of books has gone up sky high in recent years. How can we afford to buy educational materials to teach ourselves, and our children, if the cost of buying a book continues to rise like this?

The book begins with a survey of the six "natural groups" of extant primates, their adaptive radiation, and geographical distribution. Species accounts use a rather abridged and outdated version of classification, which doesn't take into consideration the major work done by Groves (1989). Martin points out that Linneaus' system of primate classification is no longer acceptable. He favors the rather conservative methods of classification, and from a reconstructionist's point of view, he does not approve of the more advanced theories proposed by a number of excellent paleontologists and taxonomists in recent years. Most likely, Martin's arguments will raise eyebrows and create further debates among specialists working in the field.

Martin unfortunately uses misleading vernacular names for the two chimpanzee species in the first chapter, and throughout the book. The "common" name for the *Pan troglodytes*, as well as the "pygmy" or "dwarf" name for *Pan paniscus*, became largely inappropriate in recent years, and should no longer be used (de Waal, 1989). This is partially because there is no difference in body size (Jungers & Susman, 1984) between the average male bonobo, and the smallest sub-species of chimpanzee, and the differences per se are the result of allometry in the comparison of craniodental and postcranial regions (Shea, 1984). Also confusing is Martin's statement, "The orang-utan is virtually solitary in habits." (p. 34). This completely ignores several of the later observations published (e.g. Galdikas, 1985).

The available fossil remains are rather "fragmentary fossils", as Martin points out in the second chapter; restricted to fragments of jaws, dental remains, and other hard parts of bone. The primate fossil specimens "should be viewed with special caution" in order to reconstruct primate evolution. Such a statement will underestimate the effort of the majority of paleontologists. Despite the scarcity of primate fossils, paleontologists cannot be blamed for not finding enough substantial evidence. The significance of paleontology becomes evident even when more readily available data exist in living specimens in order to follow up the steps of primate evolution. In Chapter Four, Martin dissects the adaptive radiation of mammals, examining the distinction between living mammals and reptiles in great detail. Using the fossil record of mammalian origins, he indicates the separation of mammals from reptiles in the perspective of over 300 million years. Continental drift and the importance of body size are well emphasized.

Martin brings up the question "Are tree-shrews primates?" in Chapter five. The answer is a clear no, despite frequent but declining comparative studies as they occur in the literature in recent years. Tupaia should be eliminated from the pages of Current Primate References, or others like fruit-bats (*Megachiroptera*) should be added, based on their primate-like visual system (Martin, 1986).

From Chapters Six to Eleven, Martin compares everything possible, and clearly reviews

## Book Review, Continued

topics such as diets and dentition, the skull, the major sense organs, the central nervous system in the view of evolution, reproductive biology, locomotor patterns, and finally chromosomes, proteins, and genetic evolution. These six chapters of over 400 pages are the most useful for animal keepers working with various primate species in captive settings.

The final chapter asks many questions which made me go back and read several chapters over again. It makes points that will probably lead into further debates and also encourages researchers to conduct further investigations for years to come.

The text is easily understood, the charts are clear, and the drawings are simply phenomenal. The author's taxonomic indices are comprehensive. The reference section, although some fifty pages long, could at some points be more complete. The book is a herculean task, and despite the high price, I wish to recommend it to everyone involved with any primate species in all circumstances and levels.

## References

- de Waal, F.B.M. 1989. Introduction: The fourth ape. pp. 152-153 in Understanding Chimpanzees. P.G. Helthne, L.A. Marquardt, eds. Harvard University Press/Chicago Academy of Sciences.
- Galdikas, B.M.F. 1985. Orang-utan sociality at Tanjung Puting. American Journal of Primatology. 9:101-119.
- Groves, C.P. 1989. A Theory of Human and Primate Evolution. Oxford University Press.
- Jungers, W., and R. Susman. 1984. Body size and skeletal allometry in African apes. pp. 131-178 in The Pygmy Chimpanzee. R. Susman, ed. Plenum Press.
- Martin, R.D. 1986. Are fruit bats primates? Nature, Lond. 320:482-483.
- Shea, B.T. 1984. An allometric perspective on the morphological and evolutionary relationships between pygmy and common chimpanzees. pp. 89-130 in The Pygmy Chimpanzee. R. Susman, ed. Plenum Press.

## The Biology of the Naked Mole Rat

Edited by Paul W. Sherman, Jennifer U.M. Jarvis and Richard D. Alexander. 1991.

Princeton University Press, Princeton, NJ  
517 pgs. Softcover. \$24.95.

*Review by Karen Anderson  
Senior Keeper Mammal Dept.  
Brookfield Zoo, Brookfield, IL*

This book provides the most up-to-date and detailed field and captive data on this unique mammalian species. The book is organized into four sections. The first section serves as an introduction to the species. The chapters in this section deal with theories of evolution and do not have as much "practical" information as other sections of the book. The second section covers field studies which gives an understanding of naked mole-rats in nature. Topics covered include burrowing, food and volcaning (a very important mole-rat behavior). The last chapter in this section covers genetic variation. Here a basic knowledge of genetics is required for real understanding of the material presented.

The third section covers behavior and social organization of mole-rat colonies. An ethogram is presented in Chapter 8 which is a good information source for any keepers or educators who work with these animals. Information on vocalizations is also covered. The final section is perhaps of the most interest to keepers who care for naked mole-rats directly. This section presents information on reproduction of naked mole-rats in captivity. In the final chapter, unanswered questions about naked mole-rats are discussed. This chapter is most welcome as it is thought-provoking - a type of chapter not usually found in most animal books.

Overall, despite being somewhat technical in nature, I would recommend keepers adding this book to their library. For those keepers who have naked mole-rats under their care this book should be required reading as it presents all that is known about mole-rats in one source for a reasonable price.



**Animalwatching**

By Desmond Morris

Crown Publishers, Inc. 1990

201 East 50th St., New York, NY 10022

256 pages Hardback \$35.00

*Review by Melba T. Brown  
Department of Mammals  
National Zoological Park  
Washington, D.C.*

Desmond Morris has done it again! Animalwatching is a vastly educational and entertaining book. It covers many areas of ethology, describing those behaviors commonly seen by wildlife observers and those often privy to the animals themselves. Morris delves into the world of animals from anemone fish to zebra finches with everything in between.

Many have perused ethology books of old and have been mindboggled by complex ethological jargon and concepts. Morris, however, presents this same information in such a way that it keeps the reader's attention without fail.

I think it necessary that you have the opportunity to read the entire table of contents in order to fully appreciate the range of topics that this publication encompasses: Introduction; The Animal-watcher; Why does the Zebra have Stripes?; Grouping Behavior; Escape Behavior; Protective Armor; Camouflage; Warning Signals; Chemical Defense; Deflection Displays; Startle Displays; Death-feigning; Self-mutilation; Distraction Displays; Mobbing; Food-finding; Luring Behavior; Food-preparation; Food-storage; Mutual Aid; Drinking Behavior; Cannibalism; Tool-using; Conflict Behavior; Typical Intensity; Facial Expressions; Fighting Behavior; Submissive Behavior; Courtship Displays; Arena Displays; Mating Behavior; Nesting Behavior; Parental Care; Play Behavior; Cleaning Behavior; Sleeping Behavior; References and Index. Whew!

In the section which asks why zebras have stripes, Morris discusses the conventional 'camouflage' theory, then he explains why this, in fact, is not the case. Instead of moving along to the next topic, he explores about ten other theories relating to the question and discusses the merits and faults of each. Morris more than adequately examines each section within the book. The reader will leave each page with a better understanding of behavioral components.

Animalwatching has hundreds of colorful photographs which are just as enlightening as the text. The reader will be prompted to pay close attention to his/her own observational skills in relation to animals and their behavior. Go out and buy this book - it is classic Desmond Morris material.



## **Environmental Enrichment Sources**

We have had a number of inquiries about some of the resources used for our Enrichment Options column. Information concerning the "Behavioural Enrichment Catalogue", a collaborative efforts among seven Scandinavian zoos, may be obtained by writing: Bengt Holst, Curator, Copenhagen Zoo, Sdr. Fasanvej 79, DK-2000 Frederiksberg, Denmark.

The 35-minute video "Environmental Enrichment: Advancing Animal Care", which was reviewed in AKF last fall, is available for \$40.00 (U.S.) from: Universities Federation for Animal Welfare, 8 Hamilton Close, South Mimms, Potters Bar, Herts EN6 3QD, United Kingdom. The UFAW also produces a number of pamphlets and papers which are included in a catalogue of publications which lists U.S. prices. It may be obtained by writing UFAW at the above address.



**L.I.N.K.**  
**(Liaison and Information Network for Keepers)**

Coordinator for the LINK System: Mark de Denus, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba, Canada R3P 0R5. (204) 837-2916 [h].

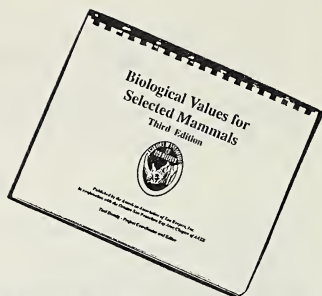
**Regional Coordinators**

**ALABAMA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**ALASKA** - Vacancy  
**ARIZONA** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**ARKANSAS** - Debbie Jackson or Ann Rademacher, Little Rock Zoological Gardens,  
#1 Jonesboro Dr., Little Rock, AR 72205  
**CALIFORNIA** - Vacancy  
**COLORADO** - Suzanne Chacon-Brennan, Denver Zoo, City Park, Denver, CO 80205  
**CONNECTICUT** - Jeanette Nadeau, Roger Williams Park Zoo, Providence, RI 02905  
**DELEWARE** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**FLORIDA** - Rick Smith, 5752 Stoneridge, Orlando, FL 32839  
**GEORGIA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**HAWAII** - Michelle Suenishi, Hilton Hawaiian Village, 2950 Ena Rd., Honolulu, HI 96815  
**IDAHO** - Vacancy  
**ILLINOIS** - Pat Swieca, 5710 W. Cullom Ave., Chicago, IL 60634  
**INDIANA** - Dan Powell, Potawatomi Zoo, 500 S. Greenlawn, South Bend, IN 46615  
**IOWA** - Carla Wieser, Omaha's Henry Doorly Zoo, 10th St. & Deer Park Blvd., Omaha, NE 68107  
**KANSAS** - Gretchen Ziegler, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606  
**KENTUCKY** - Thomas Benner, Toledo Zoo, 2700 Broadway, Toledo, OH 43609  
**LOUISIANA** - Michelle Asselin, Audubon Park & Zoological Gardens, P.O. Box 4327, New Orleans, LA 70115  
**MAINE** - Jeanette Nadeau (see addresses under CT)  
**MARYLAND** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA  
**MASSACHUSETTS** - Jeanette Nadeau (see addresses under CT)  
**MICHIGAN** - Dan Powell, Potawatomi Zoo, 500 S. Greenlawn, South Bend, IN 46615  
**MINNESOTA** - Tim Hill, Minnesota Zoological Gardens, 13000 Zoo Blvd., Apple Valley, MN 55124  
**MISSISSIPPI** - Jeannie Frazier, Jackson Zoological Park, 2918 W. Capitol, Jackson, MS 39209  
**MISSOURI** - Vacancy  
**MONTANA** - Vacancy  
**NEBRASKA** - Carla Wieser (see address under Iowa)  
**NEVADA** - Patricia Simonet, Wildlife Safaris, P.O. Box 6735, Incline Village, NV 89450  
**NEW HAMPSHIRE** - Jeanette Nadeau (see addresses under CT)  
**NEW JERSEY** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**NEW MEXICO** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**EAST NEW YORK** - Frank Leonard, Bronx Zoo, 185th & Southern Blvd., Bronx, NY 10460  
**WEST NEW YORK** - Alan Baker, Burnet Park Zoo, 500 Burnet Park Dr., Syracuse, NY 13204  
**NORTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**NORTH DAKOTA** - Bob Debets, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba  
Canada R3P 0R5 (204) 986-4040 [w]  
**OHIO** - Thomas Benner, Toledo Zoo, 2700 Broadway, Toledo, OH 43609  
**OKLAHOMA** - Debbie Jackson or Ann Rademacher (see addresses under AR)  
**OREGON** - Anna Michel, Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221  
**PENNSYLVANIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**RHODE ISLAND** - Jeanette Nadeau (see addresses under CT)  
**SOUTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**SOUTH DAKOTA** - Bob Debets (see address under ND)  
**TENNESSEE** - Gail Karr or Cindy Pinger, Memphis Zoo & Aquarium, 2000 Galloway, Memphis, TN 38112  
**TEXAS** - Ann Marie Greco, San Antonio Zoo, 3903 N. St. Mary's St., San Antonio, TX 78212  
**UTAH** - Suzanne Chacon-Brennan, Denver Zoo, City Park, Denver, CO 80205  
**VERMONT** - Jeanette Nadeau (see addresses under CT)  
**VIRGINIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**WASHINGTON** - Elandra Aum, Woodland Park Zoo, 5500 Phinney Ave. N, Seattle, WA 98103  
**WEST VIRGINIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**WISCONSIN** - Wayne Hazlett, 3768 S. 89th St., Milwaukee, WI 53228  
**WYOMING** - Vacancy  
**DISTRICT OF COLUMBIA** - Theresa Maas (see address under PA)  
**Province of Ontario** - Neil Porter, Metro Toronto Zoo, Box 280, West Hill, Ontario M1E 4R5 Canada  
**Provinces of Manitoba & Saskatchewan** - Bob Debets (see address under ND)  
**Province of Quebec** - Chantal Routhier, Granby Zoo, 347 Rue Bourget, Granby, Quebec, Canada J2G 1E 8  
**Provinces of Alberta & British Columbia** - Grant Tkachuk, 10139 157th St., #206, Edmonton, Alberta T5P 2T9



Now Available

# Biological Values for Selected Mammals Third Edition - 1992



AAZK, Inc. is pleased to announce the availability of Biological Values for Selected Mammals, Third Edition. This important reference work is a project of the Greater San Francisco Bay Area Chapter of AAZK and was the result of thousands of hours of volunteer time spent in collecting data, doing computer entry, editing, proofreading, etc. Project Coordinator and Editor was Toni Danzig of San Francisco.

This Third Edition differs in a number of respects from the previous two editions. This 1992 edition is published in an 8 1/2 by 11 inch format and is comb-bound. It contains information on 457 species of mammals and covers values ranging from geographic range and habitat to Circadian cycle, size/measurements, reproductive data, life expectancy, body temperature, rearing information and status in the wild to name a few. About half of the species listings also include habitat range maps. Every attempt has been made to use only the most widely accepted scientific resources for data gathering. The volume contains a complete bibliography of references utilized.

Biological Values for Selected Mammals - Third Edition may now be ordered through the AAZK Administrative Offices. Please fill in the form below and return with your check or money order (U.S.FUNDS ONLY) to: BV III, AAZK, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK, Inc."

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*Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKE, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for this service and phone-in listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is 913-272-2539.*

**BIRD KEEPER**...the Washington Zoological Park is looking for a full-time bird keeper. Experience with psittacines, waterfowl and cranes (raptors optional). Degree or equivalent zoo-related experience. Daily duties include bird care, habitat upkeep, breeding programs, record keeping, training, acquisitions, etc. Must be willing to work weekends/holidays. Starting salary \$12,000-\$16,000 with year-end bonus and excellent benefits. Excellent growth potential. Salary commensurate with experience. Contact/send resume to: Peter A. Rittler, Administrator, Washington Zoological Park, 19525 SE 54th, Issaquah, WA 98027. Position open until filled.

**EXPERIENCED GREAT APE KEEPER**...full-time position available with a non-profit research foundation to assist with ongoing research, Unique opportunity to work with gorillas. Responsibilities include: care and maintenance of animals, food preparation, hands-on cleaning, data collection and tallying, record keeping and general office work. This individual must be able to work closely and effectively with a variety of individuals. This position is full-time (40 hours) with a work week that includes Saturday and Sunday. We desire someone who is alert, animal oriented, aware/perceptive of people as well as animals, hard-working, able to follow instructions, possessor of good judgment and initiative and career-oriented. ASL experience preferred but not required. Salary will be commensurate with qualifications and experience. Please send letter of interest, resume and salary requirements to: Dr. Francine Patterson, Box 620-530, Woodside, CA 94062.

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**SENIOR ZOO KEEPER**...salary range \$1,799 - \$2,189/mo. ( Cost of Living Increase Effective 7-1-92). Responsible for providing lead direction, overseeing, and participating in the feeding, care, and maintenance necessary for the health and well-being of the Zoo's exhibit animals. Requires: 18 units of accredited college level course work in animal science, zoology, biology, wildlife management, or closely related field and two years of journey-level paid experience in the care, handling, and feeding of zoo animals. An additional year of qualifying experience may be substituted for the required education. Individuals interested in this position may submit a City of Fresno application and supplemental application to the Personnel Department by 5:00 p.m. Monday, **3 August 1992**. For applications or more information, contact: City of Fresno, Personnel Department, 2600 Fresno Street, Fresno, CA 93721-3614 Phone (209) 498-1574. AA/EOE/H.

**ZOOKEEPER**...Reid Park Zoo, Tucson, AZ. Requires high school diploma and at least one year of demonstrated experience in the management of exotic, non-domestic animals. Responsibilities include: complete husbandry of animals and exhibits in assigned area; animal observation; medical treatment; capture and restraint; and public contact. Salary \$18,204 to \$24,408, plus excellent benefits. Contact Raul Nararro, Senior Personnel Analyst, (602) 792-4241, City of Tucson Human Resources, 110 E. Pennington, Tucson, AZ 85726 by **10 August 1992**.



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**ANIMAL TECHNICIAN**...preferred qualifications include B.A./B.S. in related field or Vet Tech certification and experience in animal care. Duties include basic animal care of North Carolina native birds, mammals, fish and reptiles. Will assist veterinarian and keep records. Assist department director in exhibit maintenance and office work. Public education and weekend work as scheduled. Benefits good, salary Mid-teens. **Interviews in late July.** Send resume to: Director of the Animal Department, North Carolina Museum of Life and Science, 433 Murray Avenue, Durham, NC 27704-0190.



# ZIDP

**ZOO INFANT DEVELOPMENT PROJECT**



**AAZK**

**AMERICAN ASSOCIATION OF ZOOKEEPERS**

## **4 Months To Go Until ZIDP Calls It Quits!!**

Please plan now to bring or send your completed Zoo Infant Development Project Data Forms to the AAZK National Conference in San Diego. Deadline for submitting information is scheduled for October '92. Take a look at what we have received so far and you'll see there is lots of room for more on each species as well as new species that need to be added.

Thank you for all your support so far! I think the completed notebook will be one WE can ALL be proud of.

Received to date are completed data forms on the following species: Red-necked wallaby, Wallaroo, Matschie's tree kangaroo, Grey headed fruit bat, Straw colored fruit bat, Ring-tailed lemur, Mouse lemur, Greater galago, Lesser galago, Slow loris, Douroucoulis, Black-capped capuchin, Black howler, Pygmy marmoset, Black & White colobus, Colobus, DeBrazza guenon, Japanese macaque, Talapoin, Patas monkey, White-handed gibbon, Tamandua, Two-toed sloth, Coendu, African crested porcupine, Chinchilla, Patagonian cavy, Springhaas, Malayan sun bear, Sloth bear, Red panda, North American river otter, Geoffroy cat, Canadian lynx, Snow leopard, Siberian tiger, Lion, Ocelot, Grey seal, California sea lion, Tree hyrax, Southern white rhinoceros, Guanaco, Red brocket deer, Reeves muntjac, North American elk, Reticulated giraffe, Pronghorn, Gemsbok, Okapi, North American bison, and Domesticated Costwold sheep.

Send forms to: Harmony Frazier-Taylor, ZIDP Coordinator, Woodland Park Zoo, 5500 Phinney Ave. N., Seattle, WA 98103. **PLEASE Contribute Now !!!**



# AAZK Membership Application

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Zoo Address \_\_\_\_\_

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Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), made payable to American Association of Zoo Keepers, Inc., to : AAZK Administrative Offices, Topeka Zoo, 635 S.W. Gage Blvd., Topeka, KS 66606 U.S.A.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

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# Animal Keepers' Forum

August 1992

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*Dedicated to Professional Animal Care*



**Editor-In-Chief:** Susan Chan  
**Associate Editors:** Kayla Grams & Gretchen Ziegler

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### Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm ( 6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to Animal Keepers' Forum will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKF. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31. FAX # is 913-272-2539.

### DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the  
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Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.



*This month's cover features a variety of Macaws drawn by Carol Sharp of the Hogle Zoo in Salt Lake City, UT. Macaws comprise the largest sub-family of the Psittacines and some of the largest members of the parrot family. They are large birds, some Amazonian species reaching 40 inches in length, with short, stout and strongly hooked beaks. They are strong and powerful flyers native to the tropical and subtropical regions of the earth. There are at least 18 known sub-species of macaw and many are endangered due to the illegal pet trade and habitat degradation. Thanks, Carol!*

## Scoops

and

## Scuttlebutt

### Please Note Correct Date for Election Forms

All members are asked to note that the deadline for turning in AAZK Board of Director Nomination forms is 31 January 1993. The forms appeared as a blue insert in the June 1992 issue of *AKF*, but the deadline date was incorrectly put as 31 January 1992. Two seats will be up for election in 1993 - those currently held by Ed Hansen and Janet McCoy. If you would like more information on the election process, contact NEC Chair Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.

### Animal Data Transfer Form Available

Animal Data Transfer Forms for zoos and aquariums are available free of charge upon request. This is a professional service provided by AAZK. Contact: Bernie Feldman, Burnet Park Zoo, 500 Burnet Park Drive, Syracuse, NY 13204. If your facility is not already using the ADT form, please encourage your administration to implement its use whenever an animal is shipped.

### Chapters Continue Support of Association

The AAZK Board of Directors and the staff at Administrative Offices wishes to thank the following Chapters for their donations towards the operating expenses of our Association: Topeka Zoo AAZK Chapter (\$150.00); Metropolitan Boston Chapter (\$125.00) and Oklahoma City AAZK Chapter (\$25.00). This total of \$300 will help towards the purchase of a FAX machine for the AAZK offices. We greatly appreciate the support of all our Chapters.

### History Book Nears Publication Deadline/ Donations Continue

History Chair Rachel Rogers continues to put together the 25th Anniversary History Book information and it is hoped that this fact-filled volume will be available at the San Diego Conference. Lack of response from some committees and chapters has made gathering information in some areas a real challenge. Because publication deadline is nearing, a cutoff of information to be included has become a necessity. The book will be formatted in Topeka and we hope to have information on its availability in next month's *AKF*. This will be a limited edition printing, so we urge those interested in obtaining a copy to watch closely for order information and to respond quickly.

Special thanks go also to the most recent donors to the History Book Project: Robert Edington of Callicoon Center, NY and the Metropolitan Boston AAZK Chapter.



# Births & Hatchings



New York Zoological Society (Bronx Zoo)...we are back to report the following significant B&H for 1992:

Mammals - 0.0.1 Douroucouli (*Aotes trivirgatus*) [E], 0.0.3 Lesser mouse lemurs (*Microcebus murianus*) [E], 0.0.2 Rodrigues flying fox (*Pteropus rodricensis*) [E], 1.2 Blesbok (*Damalisscus albifrons*) [E], 0.0.3 Snow leopards (*Uncia uncia*) [E] [30th litter born at facility, representing six generations of breeding. 68 births since first one in 1966.]; 1.0 Pudu (*Pudu pudu*) [E], 0.0.1 Pere David deer (*Elphodus davidianus*) [E/U], 1.0 Tufted deer (*Elaphodus cephalophus*) [E], 0.2 North American buffalo (*Bison bison*) [E], 0.0.28 Naked mole rats (*Hetercephallus glaber*) [E] [queen's largest litter to date]; 0.0.2 Leopard cats (*Felis bengalensis*) [1st successful artificial insemination at our zoo]; 0.0.2 Silver leaf monkey (*Presbytis cristatus*) [E], 1.0 Silvery marmoset (*Callithrix argentata*) [T], 0.0.1 Sugar glider (*Petaurus breviceps*) [E], 1.0 Larger Malayan chevrotain (*Tragulus javanicus*) [E], and 0.0.1 Brown lemming [1st time birth for pair].

Birds - 0.0.4 Malayan peacock pheasant (*Polyplectron m. malacense*) [E], 0.0.1 Rothchild's peacock pheasant (*Polyplectron inopinatum*) [E,U] [1st for institution and North America]; 0.0.4 Red bird of paradise (*Paradisaea rubra*) [T] [significant to institution]; 0.0.2 Lesser bird of paradise (*Paradisaea minor*) [T] [significant to institution]; 0.0.2 Blyths tragopan (*Tragopan blythi*) [E] [W.P.A. species plan]; 0.0.2 Bali mynah (*Leocopsar rothschildi*) [E/SSP], 0.0.2 Blue-grey tanager (*Thraupis episcopus*) [significant to institution]; 0.0.4 Northern pintail (*Anas acuta*) [E], 0.0.1 Guam rail (*Rallus owstoni*) [E/SSP, reintroduction on Rota]; 0.0.4 Abyssinian blue-winged goose (*Cyanochen cyanopterus*) [E], 0.0.2 Inca tern (*Larosterna inca*) [husbandry change]; 0.0.2 Scarlet ibis (*Eudocimus ruber*) [husbandry change]; 0.0.2 Boat-billed heron (*Cochlearius cochlearius*) [husbandry change]; 0.0.4 Purple gallinule (*Porphyryla martinica*) [T]; 0.0.1 Pied imperial pigeon (*Ducula bicolor*) [1st hatching in Jungle World]; 0.0.1 Great argus (*Argusianus argus*) [significant to institution]; 0.0.2 Waldrapp (*Geronticus eremata*) [E/SSP]. submitted by Peter Psillas, Vice President, Bronx Zoo AAZK Chapter. Bird Section by Doug Piekarz, Chapter President.

Oklahoma City Zoo...significant B&H from Jan.-June 1992 include:

Mammals - 1 Brush-tailed rat-kangaroo (*Bettongia penicillata*) [E]. 1 Matschie's tree kangaroo (*Dendrolagus matschiei*) [1st born at zoo]; 3 White-fronted wallaby (*Macropsu parma*) [E]; 1.0 Collared lemur (*Lemur macaco collaris*) [E]; 2 Golden lion tamarin (*Leontopithecus rosalia rosalia*) [E/SSP]; 0.1 Western lowland gorilla (*Gorilla g. gorilla*) [E/SSP]; 1.0 Sumatran orangutan (*Pongo pygmaeus abelii*) [E/SSP]; 1.2 Maned wolves (*Chrysocyon brachyurus*) [E/SSP]; 0.3 Snow leopard (*Panthera uncia*) [E/SSP]; 1.0 Grevy's zebra (*Equus grevyi*) [E/SSP]; and 1.1 Goral (*Nemoorhaedus goral arnouxianus*) [E].

Birds - 0.0.1 Andean condor (*Vultur gryphus*) [E - for California condor project]; 0.0.3 Ne-ne (*Branta sandvicensis*) [E]; 0.0.1 Hawk-headed parrot (*Deroytyus accipithrinus*) [T]; and 0.0.3 Rothchild's mynah (*Leucopsar rothschildi*) [E/SSP].

Reptiles - 0.0.13 Galapagos tortoise (*Geochelone elephantopus*) [E - northern most zoo to breed this species]; and 0.0.2 Long-nose vine snake (*Oxybelis fulgidus*) [1st at our zoo]. submitted by Janet Wiard, President, OKC AAZK Chapter, Oklahoma City, OK.

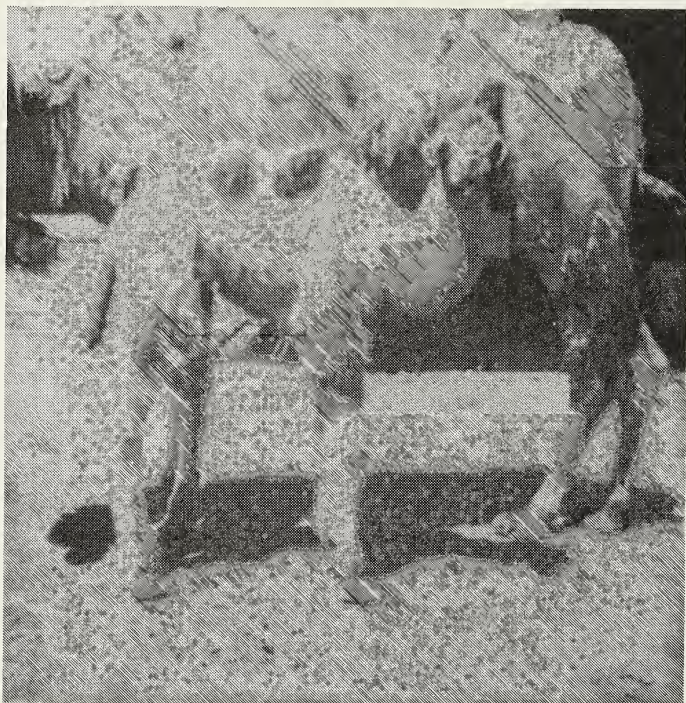


## Births & Hatchings, Continued

National Zoological Park, (Washington, DC)...the National Zoo Chapter of AAZK announces the following significant B&H for Jan. - April 1992:

Mammals - 0.0.1 Brown-headed spider monkey (*Ateles fusciceps robustus*) [T]; 0.0.2 Pygmy marmoset (*Callithrix pygmaea*) [T]; 0.0.1 Lesser tree shrew (*Tupaia minor*) [U]; Naked mole rat (*Heterocephalus glaber*) [U] [0.0.18 in 1st litter/0.0.7 in 2nd litter]; 1.1 Sumatran tiger (*Panthera tigris sumatrae*) [E/SSP] [1st time birth for institution/1st time birth for pair]; 4.1.1 Cusimanse (*Crossarchus obscurus*) [U]; 0.0.1 Oriental small-clawed otter (*Aonyx cinerea*); [SSP/4th litter for adult pair/family group of 10]; 1.0 Western lowland gorilla (*Gorilla g. gorilla*) [E/SSP]; 0.1 East African bongo (*Tragelaphus eurycerus isaaci*) [T]; and 2.1 Red wolf (*Canis rufus*) [E/SSP] [1st time birth for sire].

Birds - 0.0.3 Blue-crowned parrot (*Loriculus galgulus*) [U]; 0.0.2 Boat-billed heron (*Cochlearius cochlearius*) [U]; 0.0.11 White-backed mousebird (*Colius colius*) [U]; 0.0.1 Green-winged macaw (*Ara chloroptera*) [T]; 0.0.1 King vulture (*Sarcor hamphus papa*) [T]; and 0.0.1 Common crowned pigeon (*Gioura cristata*) [T]. submitted by Jerry C. Harris, B&H Reporter, National Zoo AAZK Chapter, Washington, DC.



Hedrick Exotic Animal Farm (Nickerson, KS) announces the birth of a 123-pound male Bactrian camel (*Camelus bactrianus*) on 6 June 1992 at 1615 hrs. The infant, as yet unnamed, is the offspring of Sheherezade, a five-year-old female owned by H.E.A.F., and a bull owned by Jim Fouts, Tanganyika Wildlife Co., Wichita, KS. This birth represents the first bactrian birth at the Hedrick establishment. submitted by Marcie Campbell, Zookeeper, Hedrick Exotic Animal Farm.



## ***From the President.....***

The Endangered Species Act will face its toughest challenge in 20 years when it comes before Congress for reauthorization in September of this year. During these difficult economic times, the ESA is considered controversial for it is perceived as having a negative impact on our economy.

Reauthorization of the ESA can take on many aspects. The Act can be strengthened or diluted. It can also be ratified with no significant changes. As of early this year, three amendments to the ESA have been introduced into the House of Representatives, only one of which is complimentary to the Act. As professionals concerned with many aspects of conservation worldwide, we must do everything that we can to preserve species in "our own backyards".

In addition to the reauthorization of the Act itself, there is also the matter of inadequate funding. The 1991 budget for ESA was listed as \$55 million. There currently are 3000 candidates for listing as Endangered Species and the list is growing daily. The cost of researching each candidate is approximately \$60,000. Controversial and high profile species, such as the northern spotted owl, drain funds from other research candidates and as a result, species that do not require immediate attention are allowed to languish until their status becomes critical.

It is a myth that the Endangered Species Act blocks economic development and causes local economies to stall. In fact, the preservation of animal and plant species insures a healthy economic climate for generations. Forests and rainforests are an untouched resource for medication, where research into this field is still in its infancy. A mentality of "jobs versus species" will spell disaster for generations to come.

Section 2 of the adopted Statement of Purpose for our Association reminds us to "support and publicize our concern for valid and deserving projects of conservation...". The constraints placed upon this Association by non-profit status do not allow Chapters to organize a lobbying effort of any sort. I am asking each of you as dedicated individuals to do your part in securing the reauthorization of the ESA. Contact your representatives and tell them that you support the strengthening of the Endangered Species Act, in conjunction with supplying the ESA with adequate funding to perform the job properly.



Ed Hansen  
AAZK President  
Reid Park Zoo, Tucson, AZ

(Note: In contacting your representative, ask him or her to co-sponsor H.R. 4045, the Endangered Species Act Amendment of 1992, and to oppose H.R. 3092 and H.R. 4058, both of which would weaken the ESA. Phone calls should be made through the Capitol Switchboard (202) 224-3121. Letters or telegrams should be sent to the following addresses:

The Honorable \_\_\_\_\_  
U.S. Senate  
Washington, DC 20510

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Washington, DC 20500





# ESA Faces Toughest Test in 20 Years

*By Dan Dagget  
reprinted from Audubon Activist  
Special ESA Issue, Vol. 6, No. 9, May 1992*

Although the Endangered Species Act has weathered three reauthorizations in its 20-year history, the landmark law now faces its stiffest test yet. It has become the center of a contentious debate over whether this country should move forward with species protection or retreat to the days of environmental neglect.

The Act is up for reauthorization in September, but most parties involved in the debate expect the process to extend well into 1993. Competing legislation to strengthen or weaken the Act has been introduced in the House, and more bills are expected soon in both chambers of Congress.

The Act itself has figured prominently in ongoing disputes over preserving ancient forests, protecting salmon in the Northwest and sea turtles in the Southeast, and a number of other instances. But remarkably - and contrary to what critics contend - it has had little negative economic impact, says Randall D. Snodgrass, Audubon's Director of Wildlife Policy.

"Critics have tried to paint the ESA as an inflexible law that has stifled economic development on a grand scale," says Snodgrass. "That's simply not true, and the facts prove it." He cites recent reports by the National Wildlife Federation and the World Wildlife Fund revealing that between 1979 and 1991, only 34 of 120,000 projects reviewed under the Act were canceled.

"The Act is far from inflexible," he adds. "It already includes provisions that take into account economic and social factors." By law a special panel commonly called the "God Committee" can override species protection measures if it finds the economic costs of such actions are too high and there are no feasible alternatives. Private landowners can even obtain permits to harm or kill endangered animals on their property, provided they develop a habitat conservation plan to minimize or mitigate the loss.

Conservationists say the current ESA reauthorization is receiving more attention because of well-organized opposition to the Act. Dismantling the Act had become a virtual battle cry of the so-called "wise use" movement (more aptly termed the "resource abuse" movement), a loose coalition of industry-funded groups calling for a rollback of environmental protection laws.

## **Gunning for the Act**

These groups have made it clear that the ESA is at the top of their hit list. "The Endangered Species Act is being used to destroy private enterprise," says Ron Arnold, head of the Center for the Defense of Free Enterprise and a leading spokesman for the movement. "We would like to repeal the act, but we know that's not going to happen."

Instead, the groups are pushing for laws that would protect developers from action to preserve species. Bills introduced by Reps. Jim Hansen (R-Utah) [H.R. 3092] and William Dannemeyer (R-CA) [H.R. 4058] would, among other things, prohibit species protection in instances where it causes economic harm, regardless of the environmental consequences. Conservationists expect more weakening legislation to be introduced in the coming months.

However, endangered species protection has strong support from many members of Congress. Rep. Gerry Studds (D-MA) has introduced a bill that would broaden the scope of the Act. The Studds bill, H.R. 4045, is supported by conservationists and came up for hearings in late May.

Endangered species protection also is backed by the general public - even in these recessionary times. A recent poll commissioned by Audubon and The Nature

## **ESA Update, Continued**

Conservancy found that 66 percent of voters approve of the ESA. Despite this general support, "resource abusers" groups have set up a smokescreen to obscure the benefits that a strong ESA offers to humans. By casting the issue as "jobs versus endangered species" they are attempting to hide the fact that protecting resources makes long-term economic sense.

They also ignore the short-term economic benefits generated by a growing tourism and outdoor recreation industry - both dependent on a healthy environment. Whether whale watching off the California coast or hiking the ancient forests of the Northwest, Americans spend billions each year on outdoor activities. Many communities have come to rely on such income.

### **Bountiful Benefits**

The "resource abusers" ignore other benefits as well. Says Bob Irvin, legal counsel for the National Wildlife Federation, "The ESA is of incalculable value to humans, whether that means preserving special places and animals to inspire us, or ensuring that possible cures for cancer don't disappear before we get a chance to discover them."

He cites the Pacific yew, which inhabits the ancient forests of the Northwest, also home to the threatened northern spotted owl. Until recently, the tree was cut and burned as scrap at logging sites, but its bark was found to include taxol, a promising drug for the treatment of breast and ovarian cancer. Drugs from other wild plants were used to treat President Bush's recent heart ailment and have been valuable in the treatment of childhood leukemia and Hodgkin's disease. Yet scientists estimate that only 5 percent of known species have been investigated for medical derivatives.

Beyond these obvious benefits, the ESA recognizes the importance of protecting all life forms, says Snodgrass. "Every living thing is part of an intricate web," he says. "We are part of it. By preserving species, we preserve our own future. It's definitely a commitment worth keeping."

## **Endangered Species Legislation**

**H.R. 4045** - Endangered Species Act Amendment of 1992, sponsored by Rep. Gerry Studds (D-MA). 69 co-sponsors. This is the centerpiece legislation in the campaign to strengthen the ESA. It has the enthusiastic support of Audubon and other conservation groups. It would, among other things, make the Act more preventive by requiring multiple species recovery plans, including both listed and non-listed species but threatened species. It requires deadlines for recovery plans and increased funding for the Act.

**H.R. 3092** - Human Protection Act of 1991, sponsored by Rep. Jim Hansen (R-Utah). 17 Co-sponsors. Opposed by Audubon. Would undermine species protection by eliminating an ESA provision that requires listing decisions to be based solely on scientific data.

**H.R. 4058** - Balanced Economic and Environmental Priorities Act of 1991, sponsored by Rep. William Dannemeyer (R-CA). Two co-sponsors. Opposed by Audubon. Would prohibit federal actions to conserve species until Interior or Commerce secretaries had determined actions would not cause economic harm. Mandates compensation to businesses for "losses" resulting from listing of species.

--from Audubon Activist , special ESA issue, Vol. 6, No. 9, May 1992



## AAZK Announces New Professional/Contributing Members

Jennifer Dustin, Boston Museum of Science (MA)	Jim Rice, Roger Williams Prk. Zoo (RI)
Bill Boesenberg, Newark Museum Mini-Zoo (NJ)	Sara Rounseville, Bronx Zoo (NY)
Barbara Welsted, Great Adventure Safari Prk (NJ)	Cathey J. Moore, Greenville Zoo (SC)
Donna Cain Lockhart, Central Florida Zoo (FL)	Susan E. Nelle, Henson Robinson Zoo (IL)
Richard E. Lockwood, Oklahoma City Zoo (OK)	Michelle L. Becker, Houston Zoo (TX)
Karen Swinehart, Happy Hollow Zoo (CA)	Kelly Casavant, Happy Hollow Zoo (CA)
Camille Horner, Spokane, WA	
Thomas Patterson, Dayton Museum of Natural History (OH)	
Rhonda Storch, Chippewa Falls Irvine Park Zoo (WI)	

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Gloria Novak Finerman, Bryn Mawr, PA  
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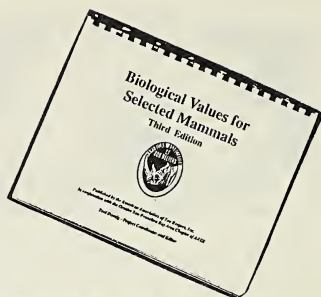
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# Viewpoint

## Counterviewpoint to "Marine Mammal Capture and The Conservation Alternative" (David Reames, author) published in March 1992 AKF

By Pete Davey and Greg Dye  
Marine Mammal Trainers  
John G. Shedd Aquarium, Chicago, IL

As marine mammal trainers and members of the zoological and aquarium profession, we found it very disturbing to read the paper submitted to AAZK by David Reames, an animal keeper at Los Angeles Zoo's Adventure Island. We feel rather strongly that these opinions on marine mammal capture and conservation alternative merit a factual response. Mr. Reames makes several claims that pertain to the collection, mortality, and breeding of marine mammals. We would like to present a few facts and set some issues straight.

To begin, Mr. Reames feels the marine mammal industry creates a strain on the wild populations of cetaceans when it collects members of a pod. The fact is, The National Marine Fisheries Service (NMFS) strictly regulates and monitors the permitting and collecting process in accordance with the Marine Mammal Protection Act (MMPA). This insures that animals are collected only from groups well above the optimal sustainable populations (OSP). In other words, a take is not allowed if it creates a strain on wild populations. It should be noted that 600 small cetaceans have been collected in the U.S. since 1972. This averages 30 small cetaceans per year, while in the last three years only 11 small cetaceans have been collected. This could hardly be considered a strain. The purpose of zoos and aquariums is to educate the public through awareness. It is only through this awareness that we may hope to conserve marine life and their habitats. The zoological community certainly doesn't want to go against its own goals. Through our marine mammal educational programs, we have a real chance to prevent 1/2 million small cetacean deaths a year that are due to human influence.

Mr. Reames feels that aquarium populations should be completely self-sustaining since land zoos are nearing that status. Zoos, however, have had 130 years to grow, develop and supplement their populations. Most oceanaria have been around for less than 25 years, and although a self-sustaining gene pool is something we strive for, more time and numbers are needed. As for "experimental" breeding being unsuccessful, of all cetacean species in zoos and aquariums, 26% were born there (35% of bottlenose dolphins). Of all pinniped species, 84% were born there. Fifty-six percent of marine mammal facilities reported births in the 1983-90 census period. Births were recorded in 17 marine mammal species. This includes manatees, sea otters, all cetacean species with more than one animal present and all pinniped species with more than five animals present (Asper et al, 1990). This success is due to the knowledge and experience accumulated through 25 years. Imagine how this obvious success could eventually translate into a self-sustaining population if there were larger, more diverse gene pools.

As for claims that the marine mammal communities already have a large enough gene pool to collectively breed in captivity...no population biologist can or has ever made that assessment, so how can Mr. Reames make such a claim? Demographic and genetic analyses have not been done on most species, and such analysis of the bottlenose dolphin (the only species of any significant number) indicate there are not sufficient founder representatives to assure survival for the next 150-200 years (Bioscience. Vol. 41). These figures are based on the current total population numbering 328 dolphins scattered throughout 102 zoological institutions (Asper et al). As for other species of captive marine mammal (that Reames claims have enough individuals) the second largest population of any cetacean in zoos and aquariums is 30 beluga whales in 7 different institutions, then 26 killer whales, and 18 Pacific white-sided dolphins (Asper et al, 1990). These numbers alone, not even taking into account age structure and diversity, are not sufficient for a self-sustaining gene pool.



## Viewpoint. *Continued*

Then there is the accusation that animals are collected from populations depleted by disease or slaughter. This accusation is totally without merit:

The Marine Mammal Protection Act states:

1. No permit is issued for takes where animals are
  - a. Pregnant at the time of taking
  - b. Nursing at time of taking
  - c. Taken from a species or population stock designated as depleted\*
  - d. Taken in a manner deemed inhumane by the Secretary of Commerce (in conjunction with NMFS, and Marine Mammal Commission).
2. No permit is issued without a current population study.

As an example, a 1990 population study done by the Canadian Department of Fisheries and Oceans found 50,000+ beluga whales at minimum in Canadian waters - 23,000 are in the Western Hudson Bay stock alone, which is where the John G. Shedd Aquarium collected its two whales. This is .0008% of that stock and these two whales also count towards the aboriginal subsistence take allowed by native populations. Sixty-two belugas TOTAL have been collected since the advent of marine mammal facilities, which is .0028% of the current Western Hudson Bay stock alone.

Finally, NMFS and/or Canadian Department of Fisheries and Oceans observers are on board for collection, as is at least one veterinarian, more often 2 or 3.

Mr. Reames also claims that a large number of captive marine mammal deaths occur during the first few days after capture or during the first two years of their adjustment to captivity. We checked the Marine Mammal Inventory Report (NMFS 1989) and found the following:

Using a cross section of large facilities, of 210 bottlenose dolphins 29 died within two years (14.4%) - 4 of the 29 died in the first few days (2%). Of 38 Pacific white-sided dolphins, 6 died within 2 years (15.7%) - none died in the first few days. Of 25 killer whales, 3 died within 2 years (12%). Of 36 belugas, 2 died within two years (5.3%). These numbers hardly reflect "a large number", and even with these very low numbers, it is not possible to attribute death to collection, especially in a two-year span. Animals die, whether free-ranging or in a zoo or aquarium, and to assume 100% survival of those animals not collected is incorrect. Actually, analyses of comparative survival rates find that survival in zoos and aquariums may be better than, let alone equal to, survival in the wild (DeMaster and Drevenak, 1988). All of the above information can be verified through NMFS, or by reading The Marine Mammal Inventory Report.

The knowledge gained by caring for marine mammals in zoos and aquariums is used to help sick or stranded animals, but to try to use these animals as the primary source of bolstering captive gene pools could destroy long term survivorship. Often stranded animals, if they survive, are added to the gene pool. But it must be remembered that one does not know the medical history or physical state of a stranded animal. What might these animals transmit to healthy populations? What genetic fault might they pass on? There is a reason they stranded! There is a likelihood of a genetic predisposition to disease or shortened life expectancy (Bioscience, Vol. 41). This weakening and watering down of the gene pool would undoubtedly harm, not help, our chances for a self-sustaining population.

Finally, while the idea of reintroduction to the wild is a laudable objective for zoos and aquariums, it is far from the only objective. Many environmental organizations support

\*Defined as a species of population stock below optimal sustainable population (OSP), or a species or population stock listed as endangered or threatened. MMPA of 1972, amended 1988.

## Viewpoint, *Continued*

the educational, conservational and scientific goals of zoos and aquariums including The American Association of Zoological Parks and Aquariums (AAZPA), The International Union For the Conservation Of Nature and Natural Resources (IUCN), The World Wildlife Fund (WWF), The Nature Conservancy (TNC), and Conservation International (CI). According to WWF President Kathryn Fuller, experiences at zoos and aquariums are perfect opportunities for expanding on the natural awe and wonder of life. The AAZPA and IUCN acknowledge that habitat protection alone is not sufficient to maintain biotic diversity, and encourages establishment of captive self-sustaining populations. These groups also recognize the wealth of experience available in oceanariums including husbandry, veterinary medicine, reproductive biology, behavior and genetics.

No one will care about what is left in our world if we won't or can't show them and teach them about these animals. In order to accomplish a self-sustaining population of several species of marine mammals so that we can continue to teach and conserve through awareness, we must be able to build gene pools of sufficient diversity, age structure, and number. Oceanariums would be delighted to accomplish this within our own doors, but without continued collection and introduction of fresh genes....it will never be.

Zoos and aquariums continue to work together to further education, conservation and animal care. One individual throwing stones can threaten all the hard work and cooperation that goes into reaching those goals.

All information in this paper can be verified through NMFS, the listed references or by reading The Marine Mammal Protection Act.

## References

1. A copy of the Marine Mammal protection Act is available from NMFS, as is the Marine Mammal Inventory.
2. Edward Asper, Deborah Duffed, Norie Dimeo-Ediger, Darey Smell, Marine Mammals in Zoos, Aquaria and Marine Zoological Parks in North America: 1990 Census Report. International Zoo Year Book (1990) 29:179-187. Zoological Society of London.
3. Margie Hope-Ames, Dr. Brian Joseph DVM; Bioscience, Vol. 41, No. 11.
4. Douglas De Master, Jeannie Drevenak, survivorship patterns in three species of captive cetaceans, U.S. Marine Mammal Commission Marine Mammal Science (Oct. 1988) 4(4): 297-311. Society of Marine Mammalogy.

## Counter-Viewpoint No. 2

*By Jeffrey E. Haun, Chairman  
Marine Mammal Interest Group*

On behalf of the Marine Mammal Interest Group (MMIG) which represents 25 zoos, oceanarium and scientific research facilities which display marine mammals, I would like to respond to the paper written by David Reames and published in Animal Keepers' Forum, Vol. 19, No. 3, 1992. MMIG members realize that there are individuals who have strong personal feelings on both sides of the issues concerning captivity and the removal of a marine mammal from the wild. MMIG does not object to personal philosophical differences of opinion but we do object strongly to the deliberate spread of outdated, inaccurate information and false accusations.

Mr. Reames' article is full of inflammatory and inaccurate accusations presented as though they are fact. We, therefore, feel compelled to respond and request that you publish our response so that your readers may have the benefit of the following information.



## Viewpoint, *Continued*

Individuals who were instrumental in the writing of the Marine Mammal Protection Act (MMPA) will tell you that without the public display of marine mammals to encourage public awareness and concern for them there would be no MMPA. The MMPA and the 1988 amendments to the MMPA recognize the benefits of public display and therefore specifically provide for a permit system to allow for the live capture of marine mammals.

Mr. Reames accuses the marine mammal industry of "placing an unnecessary strain on wild populations" in an effort to continually replenish their captive stocks and claims that the industry has failed to develop self-sustaining populations "due to a lack of trying or marine mammals simply do not breed well in captivity." Anyone actively working with marine mammals who is current on these topics or made any effort to research captive breeding performance would know that nothing could be further from the truth.

Census data for marine mammals in zoos, aquaria and marine zoological parks in the U.S. and Canada have been tabulated and compared over four census periods, pre-1976, 1976-1979, 1979-1983 and 1983-1990 (Cornell and Asper, 1978; Cornell et al, 1982; Asper et al, 1988, and Asper et al, 1990). For each census period, institutions maintaining marine mammals provided detailed and complete data on acquisitions, birth, mortalities, estimated ages and sex.

Over the years of the census, data indicates there has been a significant and continuing trend in each of the three major species maintained in captivity towards increased numbers of births per year. For pinniped species (numerically this means predominantly the California sea lion and the harbor seal), the percentage of the acquisitions in each census period which were from captive births went from 12% in the 1976-1979 census period to 84% in the last census period, 1983-1990. The captive populations of California sea lions and harbor seals are now essentially self-sustaining. There was an increase in the percentage of cetacean acquisitions from captive births as well.

As a result of increased field research efforts, (in which zoo and aquariums participate) comparative data from wild marine mammals are now becoming available. Census data collected for a wild bottlenose dolphin population which is known to be resident in the area of Sarasota on the central west coast of Florida, makes it possible to look at various demographic features of the bottlenose dolphin population in captivity in comparison to a population in the wild. Included in the comparisons made in "Bottlenose Dolphins: Comparison of Census Data from Dolphins in Captivity with a Wild Population" (Duffield and Wells, 1990) were data on crude birth rate, fecundity rate and recruitment rate.

Crude birth rate was determined as the number of births in a year relative to the total number of dolphins in the sample in that year. Fecundity rate was determined as the number of births surviving to one year of age relative to the number of mature females in the sample. Recruitment rate was the number of calves surviving to one year of age relative to the population size during the birth year, minus the number of births.

Mean crude birth rate, fecundity rate, and recruitment rate WERE ALL HIGHER IN THE CAPTIVE POPULATION THAN IN THE SARASOTA POPULATION. The conclusion of the Duffield and Wells study was that all parameters measuring reproductive performance in the captive dolphin population EXCEEDED those of the wild population. Mr. Reames states that "often the industry captures animals from areas where the wild populations have been extremely depleted from disease or from the intentional slaughter of the animals." This is not only totally untrue but a completely irrational claim. No one would collect from a diseased population and dolphins are not "intentionally slaughtered in U.S. waters." In instances where the National Marine Fisheries Service (NMFS) has issued permits for the importation of cetaceans collected in Japanese waters, these fortunate animals were SAVED from certain slaughter.

Mr. Reames also claims that "the trauma of capture has a profound effect on the social structure of a group" and that "this destruction would in turn cause a reduction in the reproductive success of the wild population".



## Viewpoint. *Continued*

To the contrary, experience derived from the Sarasota population studies, where bottlenosed dolphins have been captured and released sometimes twice per year over a ten-year period to acquire important biological information (and many animals captured on repeated occasions over this time period) has enabled researchers to follow these animals both immediately as well as over long term and observe any "capture trauma". In fact, these animals are observed behaving normally in all respects within minutes of the experience, and none have been noted with reproductive difficulties. Never has there been observed "destruction of the social framework". Had any such deleterious affects been observed whatsoever, this long term and uniquely valuable currently ongoing program would no longer remain active.

Experienced ethologists familiar with the social dynamics of wild dolphin populations will tell you that dolphin social groups are fluid not static, that it is not uncommon for individual animals to move between social groupings. The fact that an individual animal leaves a group in the wild because it was collected, or became ill and stranded is not likely to impact the overall reproductive success of the whole population!

Since Mr. Reames is not an active member of the marine mammal community he is obviously ignorant of the fact that modern public display facilities are already working together to breed marine mammals collectively.

At the national level, the Wildlife Conservation and Management Committee of the American Association of Zoological Parks and Aquariums (AAZPA) has approved a Taxon Advisory Group (TAG) for marine mammals. The TAG will coordinate breeding programs for animals in this taxon, which includes all whales, dolphins, and porpoises. The TAG will also cooperate with the International Union for Conservation of Nature and Natural Resources (IUCN) to manage marine mammals worldwide in a way that would preserve genetic diversity. Mr. Reames' suggestion that the industry "provide refuge for sick and injured stranded animals" reveals his blatant denial of the tremendous amount of energy, time and financial resources that public display facilities donate every year to the rescue and care of stranded marine mammals, many of which are given a second chance at life because of the hard work of real marine mammal keepers.

The fact that such malicious accusations and deliberate inaccuracies regarding the marine mammal community were published in an animal keepers journal is an urgent call to arms to all of us who have dedicated our lives to the betterment of marine mammals, both captive and wild. We believe that each of us has a responsibility to help set the record straight. Too often only disgruntled, habitual protesters take the time and effort to write a letter. The marine mammal community is accused of "being consumers of wildlife". We believe we are not only the producers of wildlife but the champions of wildlife. Experienced marine mammal handlers and trainers are well aware of the many success stories and should perhaps share these successes...the births, the rehabilitations, the long and happy lives made possible because of the dedicated work of those actively caring for marine mammals...with this publication and the general public.



## Information Please

The Oakland Zoo, Oakland, CA is seeking information regarding recurring subcutaneous abscesses on Dromedary Camels. Especially abscesses on front chest, external mouth and sternal callosite---their causes and preventive medicine. Send info to: Animal Management Dept., The Oakland Zoo, P.O. Box 5238, Oakland, CA 94605.

# Breeding Fairy Bluebirds at the Denver Zoo

By Suzanne Chacon, Keeper  
Denver Zoo, Denver, CO

In the off-exhibit bird propagation building at the Denver Zoo two unrelated pairs of *Irena puella* successfully produced nine offspring in the 1991 breeding season. A total of fourteen chicks hatched; three eggs were infertile or cracked, and one died in the shell on approximately Day 10. Five of the hatchlings died. All eggs were naturally incubated and three of the nine chicks were hand-raised.

The breeding season started on 28 November 1990 when the photoperiod was artificially increased from eight to eight and one half hours. The first clutches were simultaneously laid by pair A and pair B on 21 December 1990 when the light cycle reached thirteen hours. Pair A stopped laying on 24 May 1991 after producing four clutches. Pair B produced five clutches and was forced to stop laying on 23 July 1991 after their nestbox was removed. Prior to this season, our facility produced five surviving chicks in ten years. Although many eggs were laid and hatched, chick mortality was high. A management program has been developed through the years to induce breeding and facilitate rearing of the chicks.

## Housing

Both pairs consisted of wild-caught birds which arrived at our zoo between 1985 and 1988. Each bird had a different mate before being re-paired in March of 1989. None of the four birds produced surviving offspring until the 1990 breeding season when Pair A produced one chick. The pairs were housed separately from one another without visual contact although they vocalized together. Pair A was in an indoor cage 2.4m x 1.2m x 2.4m (8 ft. x 4 ft. x 8 ft.) with an adjoining outdoor enclosure (2.4m x 2.7m x 3.1m (8 ft. x 9 ft. x 10 ft.)). Pair B shared, with a pair of Bartlett's Bleeding Heart Doves (*Gallicolumba criniger*), a 2.4m x 2.4m x 2.4m (8 ft. x 8 ft. x 8 ft.) cage with an adjoining 2.7m x 3.4m x 2.4m (9 ft. x 11 ft. x 8 ft.) outside cage. They had access to their outdoor areas when the temperature exceeded approximately 10° C (50°F). The larger cage contained two 43.2cm x 43.2cm (17 in. x 17 in.) skylights, and the smaller cage had one of equal size, which provided natural sunlight.

Vita-lights®, on manual timers, were used throughout the building to produce the artificial photoperiod used to stimulate breeding. A permanent mist system was installed and was turned on for five to ten minutes once or twice a day during the breeding season. The females frequently bathed in the mist. The temperature of the building was kept between 24.4° and 28.9° C (approx. 76°-84°F) by thermostatically-controlled space heaters.

The inside cages had concrete floors which were hosed weekly. If eggs were present, hosing was discontinued until the chicks fledged. Tennis netting on the exterior of the inside cages and a few potted plants provided limited cover. Natural perches were placed at various heights. In the outside enclosures the substrate was soil. Shrubs were planted in the ground to provide cover. The outside enclosures were raked and pruned as needed.

## Diet

The adult diet consisted of: 45ml (3Tbsp.) of chopped fruit mix; 30ml (2Tbsp) of chopped romaine lettuce and spinach; 15ml (1 Tbsp) of Nebraska Brand® Bird of Prey diet with a "bread" coating; 15 ml (1 Tbsp) of honeycreeper mix; a dozen pea-sized pieces of exotic or seasonal fruit (avocado, papaya, nectarines, strawberries, blueberries, etc.); one orange slice; and two pea-sized pieces Nebraska Brand® Bird of Prey diet. A dozen live insects (mealworms, waxworms and crickets) are offered twice daily. Fresh food and water bowls were put out once daily in the morning.





**Pictured Clockwise - (top left) Adult Male Fairy Bluebird; (top right) Adult Female Fairy Bluebird; (bottom right) 32-week-old Juvenile Male Fairy Bluebird; and (bottom left) 21-week-old Male Juvenile Fairy Bluebird.**

**Photos Courtesy of Bruce Kane**





## **Breeding Fairy Bluebirds at the Denver Zoo, Continued**

Chopped fruit mix contained 30 apples, 10 bananas, 6 large carrots, 125ml (1/2 cup) of Vionate® and 125ml (1/2 cup) of bone meal minced in a food processor. The "breaded bird of prey diet" consisted of 2500g (5 pounds) of bird of prey diet, 1.125L (4 1/4 cups) of raw Spanish peanuts, 2.125L (8 1/2 cups) of dog chow, 2.0 L (8 cups) of Old World monkey chow and 6 whole hard-boiled eggs, blended and formed into strands through a hamburger grinder. Honeycreeper mix was made of 500ml (2 cups) of dog chow, 45ml (3 Tbsp) of Nekton Nektar Plus®, .63ml (1/8 tsp.) of Nekton Tonic F®, .63ml (1/8 tsp.) Nekton Tonic I® and 30ml (2 Tbsp.) of bran, all mixed together.

### **Nest Site and Egg Laying**

On 28 November 1990 the breeding season was officially started by increasing the eight-hour photoperiod by approximately one-half hour biweekly until an eighteen-hour daylight cycle was established. Egg laying began for both females when the light cycle reached thirteen hours. Both females used the same type of nest site which was an open-sided 24.1cm x 33.0cm (9 1/2 in. x 13 in.) wooden box, with a 3.0cm (1") lip on the bottom, mounted on the side wall 2.13m (approx. 7 ft.) off the floor. The majority of the nest material was straw but various items were used such as pine needles, burlap strands, leaf debris and yarn. Once the first egg (cream colored with purple speckles) was laid, the second followed 24-48 hours later. The females began incubating immediately after laying the first egg, therefore the chicks hatched a day apart. Before a chick hatched, the males were removed to a different cage in the building to prevent cannibalism, which had occurred in the past. Two days prior to the hatch date a bowl of free choice insects (crickets, waxworms and mealworms) was provided. Reclutching normally occurred after the chicks were pulled and the males were reintroduced.

### **Chick Development**

On Day 13 of incubation the first chick of each clutch hatched. The females fed the chicks mainly waxworms the first two days. After Day 3, insect feeding decreased the food bowl items were the bulk of the hatchling diet. As fecal sacs were produced the females removed them from the nest. The chicks were covered with down when they hatched. Their wings were fully feathered and blue body feathers started appearing on Day 9. At that point, they spent most of their waking hours flapping their wings and grooming themselves. Fledging occurred at Day 11 or 12. By Day 13 they were fully feathered and flying with ease. On Day 30 the chicks were eating on their own. At this age, they were pulled and the males reintroduced to the enclosures. All the juveniles looked like females until they were between 4-7 months old. At that time the males started to get black feathers on their heads and chests.

### **Hatchling Mortality**

Four hatchling deaths occurred within days of hatching. One chick died of an impacted ventriculus from being overfed. The other three causes of early death were undetermined. Another death occurred at Day 11 due to parasites, rickets and hemorrhagic enteritis.

### **Handrearing**

The first two clutches both produced two siblings and we decided to pull one chick from each nest at Day 7 to increase the chance of survival for all the chicks. Eventually, a third chick, from pair B's first clutch, was pulled at Day 14 for treatment of a leg injury which occurred when it fledged. The chicks were placed in a wicker basket, with small twigs lining the bottom, inside a 30.5cm x 42.0cm (12 in. x 17 in.) wooden brooder box. A 25-watt incandescent bulb initially kept the temperature at 26.7°C (. 80°F). The temperature was steadily decreased as the chicks developed feathers, until it reached room temperature.

Handreared chick development paralleled that of the parent-raised chicks. The handraised chicks were fed with forceps every half hour from six in the morning until ten



## **Breeding Fairy Bluebirds at the Denver Zoo, Continued**

at night. Each piece of food was dipped in water before it was offered. They were offered corn kernal-sized pieces of decapitated waxworms and crickets, a variety of fruit, soaked dog chow, and pieces of hardboiled egg yolk. At Day 7 and 8 they ate four to six pieces per feeding. Each day the amount was increased by one to two pieces per feeding until the chicks finally stopped begging while being fed. At Day 20 the chicks started refusing food occasionally and would eat from the food bowl by themselves. Feedings were then decreased to once a hour. They were weaned at Day 30.

### **Conclusion**

I attribute the success of our breeding program to a variety of factors: the assortment of food offered, with emphasis on the amount of exotic and seasonal fruit; the availability of live insects, especially waxworms, which were fed to the hatchlings; the artificial photoperiod; the decision to pull one of the two siblings; the maturity and compatibility of our birds; and the installation of the permanent mist system. Many of the Fairy bluebirds in captivity are wild-caught and unreliable breeders; hopefully, with improved husbandry techniques, we can produce a viable captive breeding population and continue to exhibit this beautiful bird without relying on the wild population to sustain the number in captivity.

### **Acknowledgment**

I would like to thank Laura Roark for her technical guidance and for devoting every Saturday to the birds under my care. Thanks also to Peter Shannon, Curator of Birds/Audubon Zoo, and Charles E. Siegel, Sr. Curator/Birds at the Dallas Zoo for their assistance in reviewing this manuscript.

### **Products Mentioned in the Text (Materials Used)**

Duro-test Vita-lights, 23415 Cabot Blvd., Hayward, CA 94545

Rich Health Vionate, 2792 Walnut Ave., Tustin, CA 92680

Swift Steamed Bone Meal, 4800 Packers Ave., St. Joseph, MO 64504

Nekton-Produkte - Nektar Plus, Nekton F and Nekton I, D-7530,  
Pforzheim, West Germany

Nebraska Brand Bird of Prey, Central Nebraska Packing, Inc., North Platte, NE 69101



### **Tree Kangaroo Husbandry Notebook Now Available**

The following publications are now available from the Woodland Park Zoological Gardens. The cost includes postage (surface mail overseas orders).

Checks should be made payable to the Woodland Park Zoological Society in U.S. Funds only. Mail your order to: Attn: Carolyn Anderson - Tree Kangaroo Project, Woodland Park Zoological Society, P.O. Box 31665, Seattle, WA 98103.

<b>Tree Kangaroo Husbandry Notebook</b> (updated 12/90 and includes survey results)	<b>\$20.00</b>
<b>Tree Kangaroo Survey Results</b>	<b>\$10.00</b>

When ordering the survey Results only, please indicate if you already have a notebook and the December 1990 update sheets will be included.

# THE FOREST ARK

## Foreign Keeper Sponsorship Program

By  
Mona Keith, Chinook Chapter AAZK  
Calgary Zoo, Calgary, Alberta, Canada

Two hundred kilometers from the nearest railway station, Chandrapur, surrounded by mountains and dense forest, lies the small village of Hemalkasa. It is here in central India that Dr. Prakash Amte and his wife, Dr. Mandakini Amte, have dedicated their lives to the tribals known as the Madia Gonds.

They run a free school for 250 children, a free 20-bed hospital and an orphanage for 25 homeless kids. But what interested us the most was Amte's Ark. It all started when Dr. Amte rescued a fawn from a man who was planning to eat it. Then later a leopard cub was brought to him. Soon the tribals began bringing in whatever orphaned or injured animals they found. These people were often giving up a potential meal so Dr. Amte always rewarded them with some money or foodstuff such as rice. The collection grew. Soon the native animals of the forests that surround him became a large part of his life's commitment. To date, Amte's Ark includes over 17 species, including Banded krait, Cobras, Sloth bear, Malabar squirrels, Leopards and Striped hyenas.

The Amtes have taken on an important role in the environmental education of the native people. The natives think of animals only as food or as enemies. The Amtes are trying to show that all animals have a role in the ecology of the forest. Killing for food or to prevent danger is a short-term gain and a long-term loss. Having this collection of native species provides natives with the opportunity to learn more about their country's wildlife and its importance (sound familiar?). Dr. Amte strives to encourage the people to avoid over-killing for food and teaches them how to avoid dangerous encounters. Overall, he is showing them the vital importance of a balanced ecosystem.

Running this "zoo" of course has its problems, mainly financial. Also, being a medical doctor he is faced with a lack of experience caring for wild animals. He does, however, have a great love for the animals and is learning from necessity.

The local children learn farming, horticulture and zookeeping as part of their schooling. This helps in the daily care of the animals and instills in the children a sense of responsibility for both the animals in the zoo and in the wild.

Prakash Amte is in need of information on the care, hand-raising and medical treatment of his animals. As a small Chapter of AAZK, we saw him as a "Keeper" we could help through the AAZK Foreign Keeper Sponsorship Program. Through this program, as a Chapter we pay for his membership in AAZK, therefore supplying him with *Animal Keepers' Forum*, and an avenue to communicate with zookeepers worldwide. We have sent him several packages of information and books. Due to the cost of postage for him, we do not hear from him often but he has made it clear that he greatly appreciates the materials we send him and regrets that he cannot write more often.

We often take for granted the wealth of information available to us. Many countries are not so lucky. We need to be reminded how valuable a few articles and books can be to people like Prakash Amte and his wife. Prakash Amte and his wife Mandakini have chosen the hardships of a life in a remote forest village in India, giving up more lucrative jobs in the city. They are putting their efforts right to the roots of the problems. They are helping to create a better life for the people and wildlife of a remote but important part of India.

The Foreign Keeper Sponsorship Program has broadened my perspective of zookeeping worldwide, mainly the difficulties faced in countries that are not as fortunate as ours. It has also increased my awareness of the influence we as members of AAZK can genuinely have towards improving the standard of animal care worldwide by promoting communication among members of the zookeeping profession everywhere.







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IN  
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POSITION/TITLE

AAZK CHAPTER

NUMBER OF AAZK NATIONAL CONFERENCES ATTENDED

AAZK COMMITTEE MEMBER?

PRESENTING A PAPER?	YES	_____	NO	_____
CONDUCTING A WORKSHOP?	YES	_____	NO	_____
PARTICIPATING IN ZOOLYMPICS?	YES	_____	NO	_____
BRINGING AN AUCTION ITEM?	YES	_____	NO	_____

VEGETARIAN?	YES	NO	TYPE
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T-SHIRT?	YES	NO	SIZE	SM	MED	LG	XLG
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ARRIVAL DATE AND TIME

**EARLY REGISTRATION INCENTIVE TOUR:**

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### CONFERENCE FEES\*

AAZK MEMBER OR SPOUSE	\$95.00	_____
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SAN DIEGO, CALIFORNIA  
SEPTEMBER 27 THROUGH OCTOBER 2, 1992



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Rooms for the AAZK Conference are being held until August 21st. Any reservations made after that date will be on a space available basis only.

A 24-hour cancellation notice is required for deposit refunds.

Check-in time is 4:00 p.m. Check-out time is 12:00 noon.

To make reservations by phone, dial 1-800-288-0770.

Most rooms have two double beds, sleeper sofa, and kitchenette. King-size rooms are available on a request basis only.

Parking at the Catamaran is free for those registered at the hotel. For those not staying at the hotel, there is a \$4.00 per day parking fee.

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# CALL FOR TABLES

## CHAPTER ALERT

Chapters wishing to display and sell **Chapter/AAZK** merchandise **must** reserve a table by calling the San Diego Chapter AAZK Hotline at (619) 231-1515 extension 4672 on or before **August 31**. There may be a small fee to cover the cost of table rental. These tables are reserved for **Chapters only**. Individuals wishing to sell personal merchandise are requested to contact Katy Wallis (Exhibitors Committee) at (619) 538-9177.

---

## PARTS IS PARTS

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In Syracuse you needed to know your feces; In New Orleans it was a photo finish; In Toledo it was fanatics over phonetics...Now, the ultimate challenge to test your animal identification skills...It's the **PARTS IS PARTS** Animal Identification Contest! And, what better time to "hold it" than during lunch at the San Diego Wild Animal Park. Don't forget to wash your hands!

---

## RECOMMENDED CLOTHING

San Diego was voted by meteorologists (*Holiday Magazine*) the "only area in the U.S. with perfect weather." The average annual temperature is 70 degrees Fahrenheit (21 degrees Centigrade). Most daily forecasts show San Diego to be mild, warm and sunny. The climate is ideally suited for year-round outdoor activity. The moderate climate and resort atmosphere contribute to a relative informal style of dress. Since the evenings along the Coast can get chilly, a sweater or jacket is in order all year.

### METEOROLOGICAL DATA - 30 YEAR AVERAGE Provided by National Weather Service

AVERAGE TEMPERATURE	SEPTEMBER	OCTOBER
Daily Maximum	76	74
Daily Minimum	63	58
RAINFALL	0.13 in.	0.34 in.

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## DAILY RATES AVAILABLE

NOTE: Please refer to the July issue of AKF for the Conference Agenda.

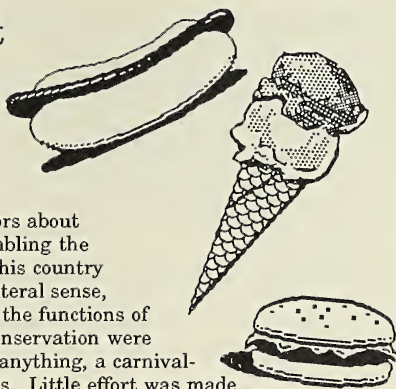
SUNDAY:	\$20		
MONDAY:	\$35		
TUESDAY:	\$30	BEACH PARTY ONLY:	\$23
WEDNESDAY:	\$30	FINAL BANQUET ONLY:	\$32
THURSDAY:	\$20		
FRIDAY:	\$50		



# You Learn What You Eat

By

C. Tromborg and G. Mitchell  
Department of Psychology  
University of California - Davis



Contemporary zoos send mixed messages to visitors about humankind's place in nature. Institutions resembling the contemporary zoological garden have existed in this country for over 120 years. Early zoos were, in the most literal sense, parks. The display of animals was incidental to the functions of recreation and entertainment. Education and conservation were virtually absent in the schemes of early zoos. If anything, a carnival-like atmosphere prevailed especially in urban zoos. Little effort was made to present animals in ways that engendered respect for their kind in the wild and animals often entertained the public with stereotypic aberrant behaviors.

In recent times, zoos have attempted to correct the poor housing conditions of many captive animals. Not only has this reduced mortality in expensive animals and increased reproductivity in endangered species, but reduction in abnormal behaviors has apparently reduced the disrespect that some zoo visitors had developed for poorly housed animals. In other words, zoos have improved their performance in the areas of conservation and entertainment.

Unfortunately, some vestiges of the traditional zoo persist in the modern zoological garden. Some aspects of modern zoos are derived from a time when entertainment was preeminent over education. In many zoos there can still be found carnival-like areas. At a time when the concept of conservation should be developed in the educational life of young people, children are still being diverted from an interest in potential ecology lessons by inappropriate petroleum-consuming, pollution-producing motorized rides.

But an even more insidious force is at work. Most of the food sold to people at zoos is artificial and unhealthy. What do cotton candy and pink popcorn have to do with creating an understanding of where food comes from? In an institution that should be emphasizing nature and natural things, the food sold is extremely unnatural. The irony of this is lost on youngsters but the environment in which they are immersed at the zoo probably does affect them. Adults should encourage an early development of respect in children, not only for the animals but for the relationship between the animals, people, and the foods they both eat.

Zoos have an opportunity to offer--to both humans and nonhumans--fresh, natural foods that suggest natural origins. Some food can originate from the same regions as the animals to which they are fed. Because no opportunity for a discussion of the effect that our agricultural practices exert on wild animal populations and their habitats should be lost, the zoo might even have concessions for humans selling the very foods that the animals they are visiting themselves consume. At the primate cage they may be sold primate food, at the bird enclosures, bird food, at the reptile enclosures, reptile food, and even at the cat enclosures, cat food (presumably here the offerings would be fish and fowl). These foods would be sold for human consumption, not for feeding of the animals. Children then could pretend they were a monkey and eat a fig, learning something in the process. The concept that human beings are animals too, and eat the same kinds of healthy things as many other animals do, is a potentially valuable message to learn in a zoo. Chipped ice covered with sugar water which has been dyed red - "snow cones" - will not do. The zoo should not function as a carnival with no rides.

As education continues to grow in its importance in the missions of most zoos, every opportunity for emphasizing the integrated nature of our surroundings should be exploited. Recycling should be regularly encouraged and practiced on zoo grounds. Smoking should never be permitted in zoos.

## You Learn What You Eat, Continued

But the most powerful area of immersion into web-of-life philosophy is through food and feeding, not of the exhibited animals, but of the human visitors. Human feeding is inherently social; we learn lots in the kitchen. Zoos display real animals, they should sell real food, and as little of this as possible should be made from domestic animals. In so doing zoos would minimize conflicting messages about the value of life - be it non-animal or animal, human or non-human. Indeed, zoos should respect human life every bit as much as they would like humans to respect non-human life. Offering the public healthy food would be symbolic of such respect.

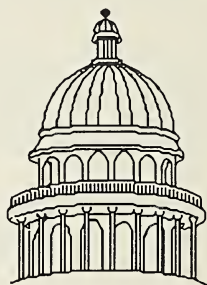
To the degree that all illustrations concerned with conserving our biosphere succeed, we will continue to enjoy the rich biological surroundings from which we and other animals arose and of which we are a part. Conversely we will find ourselves eventually holding an empty pink popcorn wrapper, wondering what went wrong.



# Legislative Outlook

Compiled by

Phyllis Nilson Wojcik  
AAZK Legislative Advisor



## New Regulations for Importation of Birds and Mammals

The Department of Interior has announced new regulations, enforced by the USFWS, to curb inhumane transport of wild birds and mammals imported into the U.S. Under new guidelines, published 17 June 1992 in the Federal Register, all imported live mammals and birds must be packed, shipped and cared for under specified humane and healthful conditions. All shipping crates must meet standards for live animals set by the International Air Transport Association.

According to Mike Hayden, Assistant Secretary for Fish and Wildlife and Parks, approximately 79,000 wild birds died in transit to the U.S. and 258,000 died in quarantine from 1986 to 1990. Annually, U.S. imports of live wildlife total approximately 14,000 primates, 500,000 wild birds, 600,000 reptiles and 125 million freshwater and marine fish.

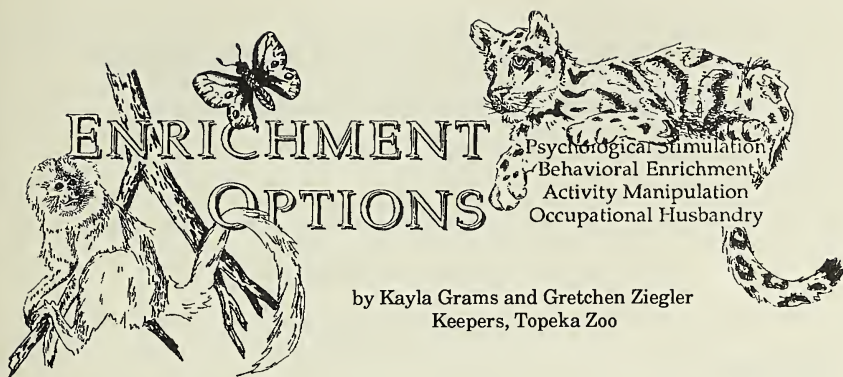
The regulations contain general provisions for humane and healthful transport, and specific sections covering primates, marine mammals, elephants, bats, other mammals and birds. Special requirements for birds include perches for perching birds, a limit of 25 to 50 birds per crate (depending on the size of the birds), sufficient food and water, and appropriate handling. Also among the new provisions is a prohibition on transporting any sick or injured animals, except for medical treatment.

The rule also addresses technical standards pertaining to all birds and mammals. These include temperature and pressure in cargo holds; length of time animals must be held prior to departure; size of crates or cages; the number of animals per crate; and provisions for observation and care during shipment. The USFW Service now will begin work to draft regulations for the humane and healthful transport of reptiles, amphibians, and fish imported into the U.S.

>Excerpted from Department of Interior News Release, 17 June 1992.







Here are some more ideas to try at your facility. We still need to hear from lots of you with your ideas and suggestions for enriching the lives of the animals in our care. Take a few minutes and send us your ideas: Send to: Enrichment Options/AKF, 635 S.W. Gage Blvd., Topeka, KS 66606.

**BIRDS** - If it isn't already a part of feeding routine, add orange slices and small bunches of grapes into an exhibit in the afternoon. It increases the activity in the afternoon hours and, if the fruit is strategically placed, allows better viewing for the public. If this is done once a week it does not take much time and the birds will not become too accustomed to receiving the treats.

Add live goldfish in pan or shallow pool for the birds to hunt. Good for Kingfishers, shorebirds (especially Egrets), Hammerkops, Sunbitterns. Surprisingly, Crested barbets and Wattled starlings also participate.

--Teri Maas, Keeper, Philadelphia Zoo

**CASSOWARIES/EMUS** - spreading their diet (preferably harder fruits and vegetables) around the enclosure will encourage natural foraging behavior, alleviate boredom and position birds where visitors can watch them. Multiple, small feedings will prolong this foraging behavior and, while it is desirable to minimize food wastage by monitoring what is left, any uneaten items would be recycled into the soil.

--Ken de la Motte, Project Planning Officer  
Taronga Zoo, Sydney, Australia

**RING-TAILED LEMURS** - we hang a small treat barrel with holes in it. The holes are large enough just to allow the animal's arms in to reach around for the treats. Coastal hay is spread on the floor and treats are spread in the hay. The lemurs use their keen sense of smell to locate the food. Fresh bamboo is hung in the habitat also - they love the leaves.

--Joann Zeliff, Keeper  
Silver Springs Attraction, Silver Springs, FL

**NORTH AMERICAN PORCUPINE** - offer browse at different heights in the enclosure to promote activity and stimulate more movement.

--Betty Jean Schmitt, Keeper  
Virginia Zoological Garden



# The Successful Hand Rearing of Two Orphaned Vampire Bats

(*Desmodus rotundus*)

By

Susan M. Barnard, Lead Keeper

Department of Herpetology

Zoo Atlanta, Atlanta, GA

and

Nancy Sachs, Atlanta, GA

## Introduction

Vampire bats give birth throughout the year, having no well-defined mating season (Turner, 1975). The gestation period is approximately five (Wimsatt and Trapido, 1952) to seven months (Schmidt and Manske, 1973). At birth, vampires are well-developed, with open and functional eyes (Schmidt, 1978). Birth weight ranges from 5 to 7 grams (Schmidt, 1988; Barnard and Sachs, unpublished data). Young vampire bats develop slowly compared to other microchiropterans, and weaning does not take place before nine to ten months of age (Schmidt and Manske, 1973; Schmidt, *et al.*, 1980).

## Background

On 9 July 1990, 30 Vampire bats were received at the residence of the first author in Morrow, GA. They were immediately divided into two arbitrary groups of 15 members each. The bats were housed in specially-designed, low-maintenance cages (FIG. 1) measuring 91.4cm (36 in.) high by 63.5cm (25 in.) wide by 50.8cm (20 in.) deep. The cages were constructed from laminated plastic, and the walls and cage top were lined with 1/4-inch polyethylene mesh. The bats were fed either citrated porcine or bovine blood, served in ice cube trays at room temperature.



FIG. 1 - Cage used to house vampire bats.



## The Successful Hand Rearing of Two Orphaned Vampire Bats, Continued

The bats remained in Georgia for four months, and during this time, six pups were born. Dickson and Green (1970) also reported births soon after arrival of their bats, but all of their neonates died a few hours after parturition. Of the six born, three were recovered for hand-raising, two were raised to adulthood by their natural mothers, and a two-month-old pup was adopted by a lactating female. The adoption was surprising because the young bat's mother was still in the colony. Unfortunately, the pup was killed at approximately six months of age. The authors presumed its death was a result of nursing attempts on other members of the group, which included adults of both sexes. Wimsatt and Guerriere (1961) observed that adults occasionally killed mobile pup attempting to suckle.

The first pup, a female with placenta still attached, was retrieved from the cage floor, but died of peritonitis ten days later. The second pup, a five-week old female, was raised to maturity after she was retrieved from the side of the cage suffering from hypothermia and bite wounds. Because one bat repeatedly flew out of the cage when the door was opened, it became necessary to confine her to another cage. Unfortunately, she may have been the dam of the second pup. The third pup, a five-day old female, was also hand-raised successfully after accidental separation from her dam during loading of the shipping crates for the bats' transport to another facility.

### Feeding

Although many inquiries were made by the authors concerning hand-raising vampire bats, it remains unconfirmed whether anyone has done so. Therefore, it was not possible to determine if vampire bat neonates are lactose-intolerant. Taking a conservative approach, and with the assistance of staff members at Pet-Ag, Inc., the authors selected a lactose-free formula comprising 10g of Multi-Milk® powder (Pet-Ag, Inc.), 2g of dextrose powder, 75ml of tap water, 2 drops of Avitron® multivitamins (Lambert Kay) and 4 drops of Avimin® multiminerals (Lambert Kay). These ingredients yielded approximately 14.0% solids (7.5% fat, 4.1% protein and 2.3% carbohydrate). The amount of water was reduced from 75ml to 60ml when each pup reached the age of six weeks. They consumed slightly different quantities of formula. TABLE 1 lists the mean daily intake for the two bats.

*Desmodus* pups apparently digest their food relatively slowly compared to other microchiropterans. When attempts were made to feed them every two hours, their abdomens began to swell and the pups became lethargic. Feedings were quickly altered to three and four-hour intervals. The problem of abdominal swelling is discussed in more detail below. Like other microchiropterans, however, feeding commenced at 0600 hours and ended at 2400 hours. Before feeding the pups, the formula was warmed in a hot water bath, and the desired temperature was checked by placing a drop or two of the formula on the inside of the wrist.

The first author has observed gastric distress in insectivorous bat pups that were allowed to suck, rather than lap, formula from the end of a syringe. To avoid similar problems with the vampires, the young were encouraged to lap formula delivered to them from a tuberculin syringe (FIG. 2). Even so, abdominal swelling became increasingly pronounced, and between the fifth and tenth days, the swelling in both bats became life-threatening. Shepherd (pers. comm.) suggested administering metoclopramide hydrochloride syrup to increase the rate of food passage. One drop of syrup was mixed with 4 drops of water. Two drops of this mixture was added to 1ml of milk replacer at every meal for four to six days, by which time the abdominal swelling was reduced. At about this time, however, both bats began refusing food. Although Schmidt (in litt.) had suggested regularly offering infant vampire bats a few drops of blood, he did not specify at what age to begin such supplements. When one part blood was added to ten parts milk replacer, both bats ate ravenously.

Not feeding the pups until their previous meal had been completely digested, also helped to avoid gastric distress. Digestion was determined visually. For example, after pups had been fed, the milk replacer could be seen in their stomachs through the skin. The pups were not fed again until the food was no longer visible.



## The Successful Hand Rearing of Two Orphaned Vampire Bats. *Continued*

TABLE 1. Feeding Regimes for Hand Raising  
*Desmodus rotundus*

AGE (Wks.)	AVERAGE DAILY INAKE (ml)	COMMENTS
Birth	0.15 to 1	
1	1 to 3	Start adding blood (see TABLE 2)
3	4 to 5	
8	4 to 6	
10	6 to 8	Consider moving to large cage
11	6 to 8.5	
13	8 to 10	
15	10 to 12	See text under weaning
24	10 to 15	
29	15 to 20	
36	On demand	Reintroduce to colony



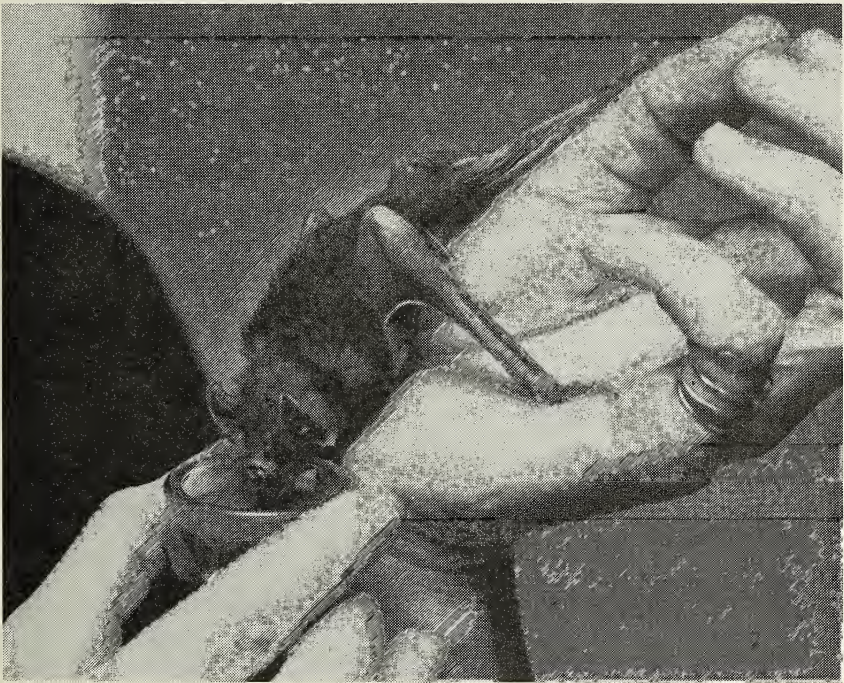
FIG. 2 - Two-week-old vampire bat lapping blood from the end of a tuberculin syringe.  
(Photo courtesy of Dany Nieves).



### **The Successful Hand Rearing of Two Orphaned Vampire Bats.** *Continued*

Food sharing among vampire bats is well-documented (Rasweiler, 1979; Schmidt *et al.*, 1980; Wilkinson, 1984, 1988). When females regurgitate blood to their young, such behavior not only serves to supplement them while they are learning hunting skills, but also serves to inoculate their digestive systems early in life with symbiotic bacteria (Muller, Pinus and Schmidt as cited in Wilkinson, 1988). As it was not possible to feed our bats regurgitated blood, it was suggested that feces from adult bats be added to the milk replacer (Wilkinson, pers. comm.; Schmidt, in litt.). The amount of feces added to the formula was determined subjectively based on color. The mixture finally used comprised one FRESH fecal pellet mixed with 0.4ml of tap water. Of this mixture, 0.1ml was added to the formula and fed to the pups for one feeding, twice weekly, when they were between the ages of one and three months. When the bats were between three and five months of age, 0.2ml of this mixture was added to the formula for one feeding each week. Because dietary comparisons with other hand-raised vampire bats could not be made, it also could not be determined if feces had any effect on the pups' development.

The pups were weaned by decreasing their intake of milk replacer, while increasing the volume of blood (for approximate ages of pups, and the ratio of blood to milk replacer, see TABLE 2). It was also necessary to prepare them to feed themselves. When each pup reached the approximate age of thirteen weeks, it was introduced to a 1½-inch glass culture dish (FIG. 3) in which the normal ration of blood-formula mixture was placed. In the event a pup refused food from the dish, additional food was held in reserve, to be fed later by syringe. Although the pups were initially reluctant to accept the unfamiliar object, they quickly adjusted and syringe feeding was discontinued.



**FIG. 3 - Three and one-half-month old vampire bat learning self-feeding skills by lapping blood from a small culture dish. (Photo courtesy of Dany Nieves).**

TABLE 2. Approximate Blood to Milk Replacer Ratios Fed to *Desmodus rotundus*

AGE (Wks.)	TOTAL FEEDINGS PER DAY	FEEDINGS WITH BLOOD PER DAY	RATIO OF BLOOD (B) TO MILK REPLACER (M) (B:M)	COMMENTS
Birth to 1	5	0	0:1	From syringe
1 to 3	5	1	1:10	"
3 to 4	5	2	1:7	"
4 to 5	5	3	1:4	"
5 to 6	5	4	1:4	"
6 to 7	5	5	1:4	"
7 to 11	4	4	1:4 - 1:3.3	"
11 to 12	3	3	1:3.3	"
12 to 13	3	3	1:2	"
13 to 15	2	2	1:2 - 1:1	From small dish
15 to 18	2	2	1:1	"
18 to 21	2	2	1st - 1:1 2nd - 1:0	"
21 to 22	1	1	2:1	Leave dish in cage 6 to 8 hrs
22 to 23	1	1	3:1	See text under weaning
23 to 24	1	1	4:1	"
24 to 36	1	1	1:0	"
36 to adult				Reintroduce to colony



## The Successful Hand Rearing of Two Orphaned Vampire Bats. *Continued*

Between eighteen and twenty-one weeks of age, the food was divided into two dishes; one dish contained the blood-milk mixture and the other pure blood. The dish of pure blood was left in each pups' cage during the evening hours (approx. six to eight hours). Until the pups learned to take food on their own (between one and two weeks), they were hand-fed from the dish containing the milk-blood mixture. Unfortunately, to the authors' frustration, blood clots in milk, usually within ten minutes or less. If the pups failed to consume their food before clotting occurred, a fresh mixture had to be offered to make up the amount that had not been consumed.

Considering the relatively long time that wild vampire pups suckle, and the observations made by Joermann (1988) on milk dependence of captive juvenile *Desmodus*, the authors did not remove milk from the diet until the animals reached twenty-four weeks of age.

### Housing

The vampire pups selected tight places in which to roost, and therefore they were housed in the same manner as described by Barnard (1991) for captive crevice-dwelling species. Two styrofoam coolers were used (FIG. 4), a small one (containing the bat) that measured 40.6cm (16 in.) long by 27.9cm (11 in.) deep by 33cm (13 in.) wide and a large one (to hold the small cooler) that measured 53.3cm (21 in.) long by 33cm (13 in.) deep by 38.1cm (15 in.) high. The small cooler was ventilated by punching holes in it with a ball-point pen. Synthetic sheepskin was placed in the cooler to provide a roost that would simulate the mother's fur. A heating pad, set on low, was wedged between the inside wall of the large cooler and the outer wall of the small cooler (FIG. 4). The cover of the small cooler was taped in place, but no cover was necessary for the large cooler. This system proved to be an excellent method for maintaining an ambient temperature of 26.6°C (80° F) within the small container. Relative humidity was maintained between 50% and 65%, either naturally or by humidifying the entire room that housed the bats.

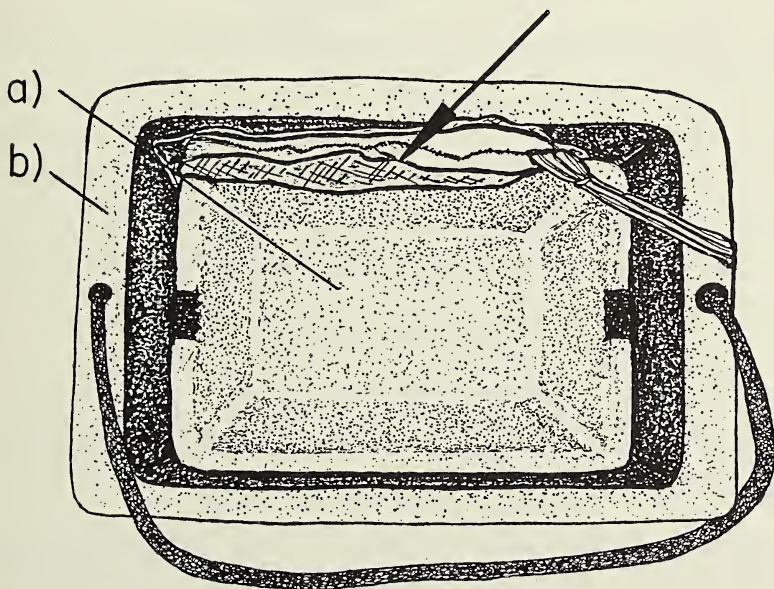


FIG. 4 - Double-cooler system used for housing infant vampire bats - (a) small cooler containing the bat; (b) large cooler; (arrow) position of heating pad.

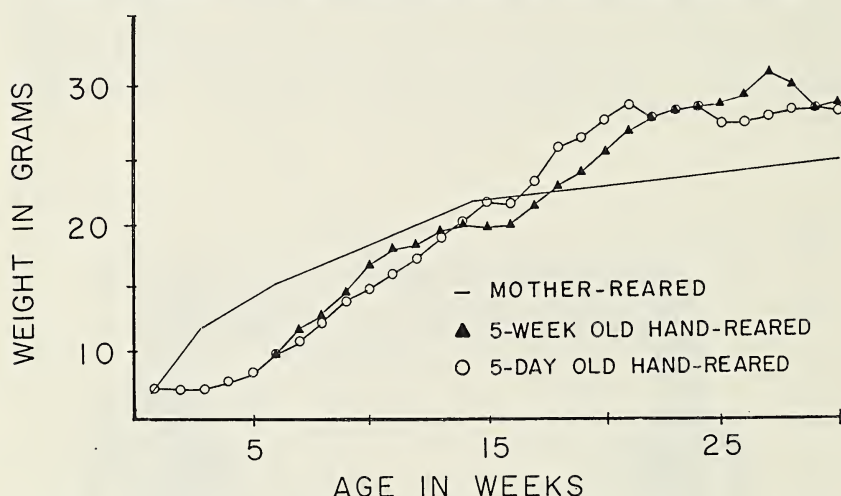
## The Successful Hand Rearing of Two Orphaned Vampire Bats, Continued

When the pups reached between two and three months of age, they became too agile for the limited space in the styrofoam cooler. Each was transferred to a cage like the one depicted in FIGURE 1. Because one bat had to be transferred during cold weather, and because the cage was relatively large (see measurements given above), it was not possible to keep the bat warm enough without the use of a heating pad. The pad (set on low) was leaned flat against the back wall of the cage. Cork bark, with a sheepskin drape, was leaned against the pad. In this manner the bat was able to select its own temperature gradient.

### Discussion

FIGURE 5 compares the growth rates of one mother-reared vampire pup (Jenness and Studier, 1976) with the authors' two hand-raised bats. Factors contributing to the initial slow growth of the hand-raised bats probably included stress from losing their dams, the adjustment to substitute teats, and the rapid change in diet. At approximately fifteen weeks of age, however, the hand-reared bats not only caught up with the mother-reared pup, but surpassed it in weight. It is not known whether the quantity and/or nutritional content of the milk replacer resulted in the rapid growth rate of the hand-raised bats. Wilkinson (pers. comm.) proposed that the difference in growth curves between the two groups suggests that the long period it takes wild bats to reach adult body weight could be a result of low milk flow by females, rather than a predetermined slow growth rate.

FIG. 5 - Growth curves for one mother-reared and two hand-reared vampire bats.



The pups' neonatal tractability diminished rapidly. FIGURE 2 shows a two-week-old pup adopting an unrestrained feeding posture, which the authors quickly learned to respect. Pups are capable of inflicting painful bites early in life, although they generally hesitate to do so.

Because of the age difference in the two pups when hand-raising began, the degree of imprinting on the surrogate mother also differed. The younger animal maintained closer body contact with the surrogate than the older pup, and at the time she started flying (120 days of age) she also began species-typical feeding activities. For example, she began licking and shaving the skin of her human foster mother's arm. These natural behaviors, which have been described by Greenhall (1988), left numerous abrasions on the arm of the second author, but never drew blood.

## The Successful Hand Rearing of Two Orphaned Vampire Bats. *Continued*

Both bats have been introduced into a captive colony comprising thirteen individuals. The hand-raised bats were not marked, so the possibility of future behavioral observations has been lost. It is known, however, that the younger and slightly smaller bat integrated with the group on the first day of introduction. Prior to this, the animal had not been exposed to the colony. The other bat, however, had been exposed to the group previously for approximately one month. Regardless, it roosted alone for seventeen days. It is not known if its isolation was by choice, or if it had received aggression from members of the group.

### Acknowledgments

The authors thank Dr. Gerald Wilkinson, Dr. Uwe Schmidt, Dr. Mimi Shepherd and members of the staff at Pet-Ag, Inc. for their time and assistance. We also thank Dr. Debra Forthman, Dr. Dietrich Schaaf, Mr. John Fowler, Mr. Sam Winslow and Mr. Reg Hoyt for their helpful comments in reviewing this manuscript.

### Products Mentioned in the Text

Avimin® multiminerals - UPCO, P.O. Box 969, St. Joseph, MO 64502. Tel. (816) 233-8800.

Avitron® multivitamins - see Avimin® above

Culture dishes - Carolina Biological Supply Co., Burlington, NC 27215, Tel. (800) 632-1231 (NC); outside NC (800) 334-5551; Gladstone, OR 97027, Tel. (503) 656-1641 (OR); outside OR (800) 547-1733.

Dextrose powder - Humco Laboratory, Texarkana, TX 75501; UPCO (see Avimin® above); also available in pharmacies.

Metoclopramide hydrochloride - A.H. Robbins Company Pharmaceutical Division,  
(Reglan syrup) 1407 Cummings Dr., Richmond, VA 23220; also available  
in pharmacies.

Multi-Milk® Powder - Pet-Ag, Inc., 30W432 Rt. 20 Elgin, IL 60120, Tel. (800) 323-0877, in  
IL (708) 741-3131.

### Literature Cited

- Barnard, S.M. 1991. *The Maintenance of Bats in Captivity*.  
Zoo Atlanta, Atlanta, GA.
- Dickson, J.M. and Green, D.G. 1970. The vampire bat (*Desmodus rotundus*): Improved methods of laboratory care and handling. *Lab. Anim.*, 4:37-44.
- Greenhall, A.M. 1988. Feeding behavior. In: Greenhall, A.M. and Schmidt, U. (Eds.) *Natural History of Vampire Bats*. CRC Press, Inc., Boca Raton, FL. pp. 111-131.
- Jenness, R. and Studier, E.H. 1976. Lactation and milk. In: Baker, R.J., Jones, J.K., Jr. and Carter, D.C. (Eds.), *Biology of Bats of the New World Family Phyllostomatidae*, Part I. Texas Tech University, Lubbock, TX. pp. 201-218.
- Joermann, G. 1988. Care of vampire bats in captivity. In: Greenhall, A.M. and Schmidt, U. (Eds.), *Natural History of Vampire Bats*. CRC Press, Inc., Boca Raton, FL. pp. 227-232.
- Rasweiler, J.J., IV. 1979. The care and management of bats. In: Wimsatt, W.A. (Ed.), *Biology of Bats*. Academic Press, New York, NY. pp. 519-617.
- Schmidt, C. 1988. Reproduction. In: Greenhall, A.M. and Schmidt, U. (Eds.), *Natural History of Vampire Bats*. CRC Press, Inc., Boca Raton, FL. pp. 99-109.
- Schmidt, U. 1978. Vampirfledermause. *Neue Brehm-Bucherei* 515.  
Wittenburg: A. Ziemsen.
- Schmidt, U. 1990. Personal correspondence. University of Bonn, Germany.
- Schmidt, U. and Manske, U. 1973. Die Jugendentwicklung der Vampirfledermause (*Desmodus rotundus*). *Z. f. Säugetierkunde*, 36:360-370.



## The Successful Hand Rearing of Two Orphaned Vampire Bats. *Continued*

- Schmidt, C., Schmidt, U., and Manske, U. 1980. Observations of the behavior of orphaned juveniles in the common vampire bat (*Desmodus rotundus*). Proc. 5th Intl. Bat. Res. Conf., Texas Tech Press, Lubbock, TX.
- Shepherd, M. 1990. Personal communication, For Pet's Sake Veterinary Clinic, Decatur, GA.
- Turner, D.C. 1975. *The Vampire Bat: A Field Study in Behavior and Ecology*. The Johns Hopkins University Press, Baltimore, MD.
- Wilkinson, G.S. 1984. Reciprocal food sharing in vampire bats. *Nature*, London, 308:181-184.
- Wilkinson, G.S. 1988. Social organization and behavior. In: Greenhall, A.M. and Schmidt, U. (Eds.), *Natural History of Vampire Bats*. CRC Press, Inc., Boca Raton, FL. pp. 85-97.
- Wilkinson, G.S. 1990. Personal communication. University of Maryland, College Park, MD.
- Wimsatt, W.A. and Trapido, H. 1952. Reproduction and the female reproductive cycle in the tropical American vampire bat, *Desmodus rotundus rotundus*. *Am. J. Anat.*, 91:415-45.
- Wimsatt, W.A. and Guerriere, A. 1961. Care and Maintenance of the common vampire in captivity. *J. Mammal.*, 42:449-455.



## *Chapter News*

support and care we get from our members and friends, the Honolulu Chapter should continue to support local and global causes.

--Thomas Fenske, Secretary

### Honolulu Chapter AAZK

The Honolulu Chapter has been a roller coaster chapter for the last year. In January the Chapter elected new officers. They are:

President.....Charlene McKee  
Secretary.....Thomas Fenske  
Treasurer.....Verla Atkins

After deciding to switch financial institutions and obtaining a checking account, the officers started their terms.

This year the Honolulu Chapter has participated in "Bowling for Rhinos". On 18 April, 44 people bowled for this worthy cause. The Chapter, with the help from the local Humane Society, Nature Company, and other volunteers raised \$2008.79.

The Honolulu Chapter also donated proceeds from various fundraisers to our local Nature Conservancy to help protect Hawaii's unique and endangered wildlife.

There are many changes occurring within our small Chapter; we hope they change for the better. With all the

### Greater Baltimore Chapter AAZK

Officers for 1992 are:

President.....Sue Scott  
Vice President.....Steve Sarro  
Treasurer.....Matt Randles  
Secretary.....Cindy Jones  
Chapter Liaison.....Chris Bartos

Nineteen-ninety-two has been a productive year for the Greater Baltimore Chapter. We have finally completed and put into effect the first of two of our Chapter-designed and built parking meters (not part of ESP Conservation Parking Meter Project). They were a long time in the making, and couldn't have been done without the help of many people. The meters were donated by the Department of Transit and Traffic, who also helped immensely in teaching us how to take them apart. The Zoo's Maintenance Department designed and built a special barrel mounting system so that money could be collected less frequently. The keepers designed the graphics, did the painting, and carved the little animals that go across the meter.

## **Chapter News, Continued**

The Chapter discussed many projects to support using the meter idea, and everyone agreed that we would like to support some of the less well known projects that are still very important, yet are in dire need of funding. We also wanted to support projects that were related to the Zoo or to the State of Maryland. The two projects that we decided to proceed with first were the Chesapeake Bay Foundation and the Bali Mynah reintroduction program. We have already raised several hundred dollars for these organizations.

Much of our initial funding to complete the meters and the graphics came from the sale of Rainforest Crunch® in the Zoo gift shop, which has been very successful. We have at least three more meter projects slated to be completed soon.

Our Chapter has also collected books and magazines for the ongoing NZP/AAZK Outreach Program. We have supported the 1992 Preakness Clean-up as well.

*--Chris Bartos, Chapter Liaison*

### **San Diego AAZK Chapter**

June was a busy month for the our Chapter, filled with three outstanding guest speakers.

Tony Fitzjohn of the George Adamson African Wildlife Preservation Trust, spoke on "African Hunting Dogs" and "The Mkomazi Project", the reserve he helped establish in Tanzania. The hunting dog is the most endangered large carnivore in all of Africa, numbering fewer than 5,000. The wild dogs are poisoned or shot, and at the present rate of decline could be extinct in less than 20 years.

Mkomazi is an area of 1,550 sq. mi. with Mt. Kilimanjaro to the west. To the north it shares a common border with Kenya's largest national park, Tsavo. Together these reserves form one of the largest protected wilderness areas in Africa. After establishing Mkomazi as a Priority National Project, the Tanzanian government invited Fitzjohn to begin a habitat restoration

program and to develop and launch an endangered species reintroduction program in the reserve.

The cheetah and African hunting dog are first priorities and will be collected from areas where they are under threat. The second priority is a black rhino sanctuary. Elephants number up to 600 on the reserve and poaching has virtually stopped due to daily aerial patrols. Radio collars for elephants, hunting dogs and cheetah have recently been purchased. The animal rehabilitation program will eventually expand to include any endangered or threatened wildlife. The Mkomazi Reserve has immediate needs and to succeed needs help. If you or your chapter would care to assist, donations may be sent to the Mkomazi Reserve Trust offices at the following addresses:

U.S.A - 1631 Pontius Ave., Los Angeles, CA 90025 (213) 445-4145

England - Linford House, Linford St. London SW 84 UN Tel: 01-498-1022

Canada - 3140 W. 55th Ave.  
Vancouver, BC V6N 3W9 Canada  
(604) 261-2023

All proceeds from ticket sales that evening benefitted the African Wildlife of Mkomazi and AAZK. Fitzjohn is best known for his work in leopard and lion reintroduction at Kora National Reserve, Kenya.

A 16-year veteran of the Zoological Society of San Diego, Dr. Phil Ensley spoke on his September '91 working trip to the Askania Nova Reserve, Russia (just 3 weeks after the attempted coup was overthrown). In just 4 days, 109 Przewalski's horses (*Equus przewalski*) were processed as the 'team' took blood and skin tissue samples, temperatures, branded/tattooed for IDs and hoof trimmed. Dr. Ensley discussed cultural aspects of the trip, and spoke proudly of the camaraderie between the Ukrainian and San Diego 'team'. Dr. Ensley's talk was a fundraiser for the Moscow Zoo (sister zoo to S.D.), which is in desperate need of animal feed and medical supplies.

"Animal Talk, Science and Voice of Nature" was the interesting lecture by



## Chapter News, Continued

Jake Page. It is also the title of his current book. He discussed short distance vocal communication among animals and birds with form linked to function. Sounds emitted are embedded in the mood, state of environment, and evolution of the animal. Page touched on the origins of human speech and intellect. He held the audience's attention by closing with a taped recording of the sounds of: 'Hoover' the harbor seal, a Carolina wren, song sparrow, and a woodthrush.

Page is former editor of Natural History and science editor of Smithsonian. He has written hundreds of magazine articles and more than a dozen books, most in the realm of the natural sciences. All proceeds from ticket sales benefitted AAZK.

--Mary Dural, Chapter Liaison

### Oklahoma City AAZK Chapter

Our Chapter has been very busy so far this year. We have been traveling to other zoos to meet their AAZK members and to tour their facilities. So far members have visited Tulsa (OK) and Sedgwick County Zoo (Wichita, KS) zoos. Their hospitality was marvelous, as were their zoos. We took a trip to the Dallas Zoo in July and will visit the Fort Worth Zoo this month.

At our May meeting Dr. Alexander, Dean of the Vet School at Oklahoma State University, spoke to us about marine mammals. It was a very interesting and informative presentation. On Conservation Day (June 6th) we set up a booth that showed pictures of endangered animals and how their numbers are declining. We also provided pamphlets about conservation and recycling. Our AAZK Chapter has a recycling program at the zoo, collecting aluminum cans and taking them to the recycling center.

AAZK volunteers manage a beer booth during concerts at the OKC Zoo amphitheatre. Volunteers have a lot of fun and earn money for the Chapter as well. A garage sale was held in July to earn even more money. This is the first year we have had enough money to help

send a keeper to the National AAZK Conference. We have also been able to donate \$25 to AAZK administrative offices as well as \$25 for the AAZK History Book project.

In late May we conducted our 'Bowling for Rhinos' and raised \$530. As this was our first time, we were quite pleased at how well we did.

The Oklahoma Nature Conservancy is working on getting us a Conservation Parking Meter to be located next door in the Omnplex Science Center. It will probably be Fall before we actually get it, but we are really looking forward to it. That's all for now!

--Janet Wiard, President

### Dallas Zoo AAZK Chapter

Our second annual 'Bowling for Rhinos' event was held on 31 May. It was another fun and successful time for all the participants and spectators as we raised over \$1,300. This year we incorporated a raffle into our pledge drive. One free ticket was entered for every \$10 pledge donated. The prize was free admission to the Zoo and a special behind-the-scenes tour of our Black Rhino facility with the chance to hand-feed the rhinos.

Congratulations went to first place bowler Dennis Waldrip (who also raised the most pledges); second place to Tracy Canon; and third place to Ceci Perez. These high scoring bowlers all received engraved rhino-shaped plaques for their effort. The winner of the raffle was Mike Steves.

On 11 June, our Chapter sponsored a membership drive party at the zoo's volleyball court. The response was good as beer was provided. The volleyball games were competitive and challenging.

Guest speakers for our meetings have been provided from our own zoo and aquarium staff. Each speaker presented their paper that was given recently at the AAZPA Central Regional Conference hosted by the Dallas Zoo. The presentations included:



## Chapter News, Continued

"An Encephalomyocarditis (EMC) Virus Outbreak at the Dallas Zoo" - Tom Alvarado, DVM

"Submitting Samples for Diagnosis of EMC Virus" - Rita Buice.

"The A.D. Martin Sr. Forest Aviary: Its First Year Evaluation" - Joel Hamilton.

"Small Antelope - the Management and Research Connection at the Dallas Zoo" - John Hnida, Amos Morris, Anne Knapp, John Sills, Lisa Fitzgerald and Rita Buice.

"Reproduction of the Comal Springs Salamander, *Eurycea neotenes*" - Thomas Jordan, David Roberts

Parasite Control and Capture Husbandry Techniques for *Ogcocephalidae*, the walking bat fishes" - David Schleser, Tom Alvarado, DVM.

Special congratulations to Research Technicians John Hnida and Lisa Fitzgerald for receipt of the AAZK Research Grant for their work in determining estrus in Gunther's Dik Dik (*Madoqua guentheri*).

--Kevin Lew, Chapter Liaison

### Rocky Mountain Chapter AAZK

Sue Benson has taken over our ESP Coordinator position due to the loss of Cate Werner. Cate recently left the zoo and she will be missed. Our Conservation Parking Meter has made \$4,000.00 since its installation in December 1991. We are really happy with the success of the meter!

We are having a joint meeting with Cheyenne Mountain Zookeepers and Pueblo Zookeepers this month. We are hoping they will reform the Cheyenne Mountain Zoo Chapter. The meeting will be in their new Ape House.

We are helping to send three keepers to the Conference this year. Suzanne Chacon, Karen Stern and Ann Zobrist will be attending. All three are also our conference committee; we are bidding for the 1995 National AAZK Conference.

The Chapter continues to support the National Zoo Chapter's outreach program by collecting magazines.

Our Chapter logo was put on T-shirts and stationery. We also got sweatshirts made with our "Bowling for Rhinos" design on them. If anyone is interested in purchasing these products, please write to our Chapter at the Denver Zoo.



On 14 August we will hold our annual picnic for zoo employees. Anyone in the area is welcome to attend.

--Suzanna Chacon, Chapter Liaison

### **Attention Chapters!**

Please keep us advised of your activities and projects. If you have not gotten into the habit of submitting news items for this column, we hope you will. Share your ideas on fundraising and projects with other AAZK Chapters. Announce your new officers, present a new logo, make other chapters aware of your conservation efforts. Items for this column should be to us by the 15th of each month. Thanks!



# ZIDP

## ZOO INFANT DEVELOPMENT PROJECT



AMERICAN ASSOCIATION OF ZOOKEEPERS

## Even More Than Previously Reported !!

I'd like to apologize to a number of you who took the time to send in ZIDP data collection forms and then didn't see your species listed last month.

I DO have them, somehow we sent in an incomplete list. The following are ADDITIONS to last month's "species received" list. Thank you all for your participation !!

The latest additions include the following species: Bennett's wallaby, Red Kangaroo, Australian fruit bat, Crowned lemur, Red-bellied lemur, Mongoose lemur, Ruffed lemur, Fat-tailed dwarf lemur, Squirrel monkey, Woolly monkey, Common marmoset, Golden-headed lion tamarin, Red-bellied white-lipped tamarin, Mandrill baboon, Lowland gorilla, Red wolf, Small-clawed otter, Sumatran tiger, East African black rhinoceros, Greater Indian rhinoceros, Dromedary camel, Reindeer, Damara, Masai giraffe, E. Bongo antelope, Dwarf zebu, Greater kudu and Thompson's gazelle. Thank you, thank you !!

Also thank you this month to Kelly Wilmoth, RVT, who sent in MEDARKS weights from the Houston zoo and Dr. Frahm of Gladys Porter Zoo who sent in additional weights to update her last list.

Thanks again everybody.....3 MONTHS TO GO.....

## Survey Info Request



The Milwaukee County Zoo veterinary hospital staff is conducting an informal survey on the working relationships between zoo veterinarians and zoo keepers, and between zoo veterinarians and zoo veterinary technicians. We would appreciate your input. Please return to: Roberta Wallace, Milwaukee County Zoo, 10001 W. Bluemound Rd., Milwaukee, WI 53226. Please respond **by 15 September 1992**. You may respond anonymously or not, whichever you wish. Many thanks!

1. If you could create the "perfect" zoo veterinarian, what traits do you feel are important for that veterinarian to possess? (7 traits maximum)

2. Are these the same traits you look for in your private veterinarian? If not, what traits differ?

You are a: \_\_\_\_\_ Keeper

\_\_\_\_\_ Veterinary Technician







# Book Review

## **Hawks, Eagles and Falcons of North America**

By Paul A. Johnsgard

Smithsonian Institution Press, 1990

470 L'Enfant Plaza, Suite 7100

Washington, DC 20560

Hardback \$45.00

*Review By Linda Moore, Keeper  
National Zoological Park  
Washington, DC*

Author Paul Johnsgard has published many fine reference books on waterfowl, shorebirds, owls and other animal groups. He continues this tradition with his Hawks, Eagles and Falcons of North America. From his dedication "to those who, like King Solomon, would know the way of an eagle in the sky" to a list of references 31 pages long, this book has something to offer anyone who is interested in North American raptors.

Raptor Classification tends to be confusing to a majority of people. Johnsgard follows the evolutionary history of this classification step by step, allowing his readers to compare the data resulting in the different groupings. For example, one table lists in detail the comparative traits of Accipitridae and Falconidae, including behavioral differences as well as morphological. The readers are allowed to draw their own conclusions regarding classification.

The natural history of these diurnal raptors as a group is detailed in several chapters under "Comparative Biology". Since foraging occupies a great deal of time in a raptor's life, the adaptations of eye, foot, bill and wing shape are closely examined, as well as interspecific differences in prey and foraging behavior. The controversial issue of reversed sexual dimorphism in raptors and its significance is scientifically analyzed, again leaving the readers to judge the facts for themselves. Prey capture, migration, territoriality, and courtship and reproductive behaviors are surveyed in these chapters. Part One ends with a discussion of population trends and mortality, including information on the status and conservation efforts of the Florida snail kite, the Southern bald eagle and the Peregrine falcon.

In Part Two, Johnsgard elaborates on the 31 species of diurnal raptors that breed in North America. Of particular note, his distribution maps show not only the range of the species but also population densities where the data exists. Each species is given a detailed account of classification information, breeding and wintering distribution, descriptions including morphological identification and measurements. Raptor banders generally find this data useful, especially when identifications are divided into birds in the field versus birds in hand. Johnsgard continues his species accounts with the following categories: Habitat and Ecology, Foods and Foraging, Social Behavior, Breeding Biology, Evolutionary Relationships and status. This provides an amazing amount of information on each particular species, and can be used by banders, falconers, educators, researchers and rehabilitators alike.

The book concludes with four appendices, including a glossary and the voluminous bibliography so valuable for further research. Paul Johnsgard gives straightforward and factual information throughout this work, resulting in a book that should reside permanently on the bookshelf of all raptor enthusiasts, as it will often be referred to.



# Beaked Whale Rehabilitation at Sea World of Florida

By  
Pedro Ramos, Animal Care Specialist  
Sea World of Florida, Orlando, FL

On the morning of 3 February, 1992, Sea World of Florida's Animal Care Department received a call from the Florida Marine Patrol reporting a beached dolphin. The Sea World rescue team quickly responded and arrived at the site a short time later, and were surprised to find not a dolphin, but a beaked whale. This made loading the animal into the rescue vehicle a little more difficult because the whale was considerably larger and heavier than a dolphin. Finally, after much struggling, a small crane in the area assisted the rescue team and they were able to get the beached cetacean into the rescue vehicle.

In order to determine medication doses, the whale was measured and weighed upon arrival at Sea World. Dr. Terry Campbell, a staff veterinarian, took blood samples, administered antibiotics, and examined his new patient. The 11-foot (3.35 m), 1,060 lb (481 kg) female beaked whale had several soft-shelled barnacles on her flukes and pectoral fins and, as is common with beached animals, was probably plagued with internal parasites. She also had several cookie-cutter shark (*Isistius brasiliensis*) bites on her side. She was placed in one of our rehabilitation pools and observed by Animal Care staff during a 24-hour watch.

At this point, the Animal Care staff was confronted with determining what species of beached whale we had rescued. There are 19 species of beaked whales, all of which are fairly rare; therefore, information on these animals is limited. These animals live mostly in deep water, and are usually seen breaching or bowing for a brief moment or dead on the beach. Many of the species of beaked whales are very similar and the most accurate methods of identifying a specimen is by its teeth. Most species, though not all, have only two teeth on each side of the mandible and the position and angle of these teeth can help identify the species. This was made more difficult because our whale was a female, and female beaked whales' teeth are vestigial—they do not erupt. Based on shape, color, and size of the beak we narrowed it down to three possible species - Cuvier's Beaked Whale (*Ziphius cavirostris*), True's Beaked Whale (*Mesoplodon mirus*), or Gulf Stream Beaked Whale (*Mesoplodon europaeus*).

During the days that followed we continued to give the whale antibiotics and fluids via a stomach tube (her blood work showed mild dehydration). She soon began eating Columbia River smelt and squid and began expelling tapeworms in her stool. The soft-shelled barnacles fell off due to the disinfecting agents in the water system, and the shark bites were healing nicely. Everything was going fine, except for one thing—we still wanted a positive identification on the species. This was accomplished with an X-ray of the head showing the buried teeth. A better view of the angle and shape of the teeth allowed us to identify the animal as Cuvier's Beaked Whale.

After a series of medical tests, it was decided that the whale was ready to be reintroduced to her natural environment. Using liquid nitrogen, an identification number was placed at the base of the dorsal fin, and on the morning of 15 February she was carefully placed into the rescue vehicle and taken to Port Canaveral. The release team then loaded her on board the Coast Guard SES (Surface Effects Ship) Sea Hawk and took her out to sea where she was successfully released on the edge of the Gulf Stream, which is the habitat for this species.





**L.I.N.K.**  
**(Liaison and Information Network for Keepers)**

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*Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKE, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for this service and phone-in listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is 913-272-2539.*

**BIRD KEEPER**...the Washington Zoological Park is looking for a full-time bird keeper. Experience with psittacines, waterfowl and cranes (raptors optional). Degree or equivalent zoo-related experience. Daily duties include bird care, habitat upkeep, breeding programs, record keeping, training, acquisitions, etc. Must be willing to work weekends/holidays. Starting salary \$12,000-\$16,000 with year-end bonus and excellent benefits. Excellent growth potential. Salary commensurate with experience. Contact/send resume to: Peter A. Rittler, Administrator, Washington Zoological Park, 19525 SE 54th, Issaquah, WA 98027. Position open until filled.

**FARM/ANIMAL CARETAKER**...(Private Exotic Animal Breeding Farm). Duties and responsibilities range from grounds and enclosure maintenance to supervising personnel. Experience with animals mandatory. Animal varieties include (but are not limited to) African hoofed stock, camels, marsupials, etc. (no carnivores or primates). Must be physically capable of handling animals and farm equipment. Excellent housing (suitable for a family) is provided on the farm. Salary negotiable and commensurate with ability. Contact: Hedrick Exotic Animal Farm, 7910 N. Roy L. Smith Rd., Nickerson, KS 67561, (316) 422-5183.

**ASSISTANT ELEPHANT TRAINER**...this position requires a Bachelor's degree in Zoology or Animal Science, plus at least two years' experience working with both adult and young Asian elephants. Applicant must have good speaking skills and experience presenting elephant demonstrations. Contact: Don Bloomer, Entertainment Department, Nugget Hotel/Casino, P.O. Box 797, Sparks, NV 89432.

**ELEPHANT HANDLER/TRAINER**...Person needed to care for well-trained 8-year-old female African elephant. Includes daily husbandry, rides and maintenance of enclosure. Requires 2 years' experience handling elephants. Send resume to: Pet Farm Park, 1228 Hunter Mill Road, Vienna, VA 22182. Attn: Shirley.

**ZOOKEEPER**...requires an Associate's or Bachelor's degree in an animal-related field. Responsible for daily care of domestic and exotic animals (primarily mammals and birds) and exhibit/grounds maintenance. Starting salary \$6.80/hr plus excellent benefits. Send letter/resume by **31 August 1992** to Mike Borders, Director, Scovill Children's Zoo, 71 South Country Club Road, Decatur, IL 62521.

**ZOO KEEPER I (Animal Encounters)**...requires 1 year of zoo keeping experience - 4 year degree in biology-related field preferred. Experience in husbandry, training, and demonstrating of domestic animals also preferred. Starting salary \$12,500 a year plus benefits. Send resume by **25 September 1992** to: Richard M. Hurst, Indianapolis Zoo, 1200 West Washington St., Indianapolis, IN 46222.

*The following two (2) positions are available with the Fort Worth Zoo. For either submit letter with resume by **31 August 1992** to: Personnel Dept., City of Fort Worth, Lower Level, 1000 Throckmorton, Fort Worth, TX 76102.*

**ZOO ATTENDANT II (Bird Dept.)**...requires high school diploma or equivalent, one year experience with birds (particularly waterfowl and wading birds) in a zoological park atmosphere. Additional education and experience desired. Responsibilities include daily feeding, cleaning, behavior observation, exhibit design, management of a large collection in an on-exhibit breeding program, record keeping and assisting veterinarian. Knowledge of plants and carpentry skills helpful. Salary \$17,376 plus excellent benefits.

**ZOO ATTENDANT II (Primates)**...requires high school diploma and one year's salaried primate experience with emphasis on great apes. In addition to providing basic animal care, the successful candidate will aid in the development of compatible social groups with a new primate facility. Salary \$17,376 plus excellent benefits.





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Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

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# Animal Keepers' Forum

September 1992

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*Dedicated to Professional Animal Care*

**Editor-In-Chief:** Susan Chan  
**Associate Editors:** Kayla Grams & Gretchen Ziegler

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## Information for Contributors

*Animal Keepers' Forum* publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm ( 6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKE. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31. FAX # is 913-272-2539.

## DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

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Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.

This month's cover features the Greater Kudu (*Tragelaphus strepsiceros strepsice*), one of the horned ungulates native to the African continent. The magnificent spiral horns of this species can reach a length of 168 cm and are used by the male in dominance and mating displays. This antelope may be found in rocky hill or mountain country where scattered or dense brush is prominent. They require waterholes with easy access and, except in times of drought or food shortages, these animals tend to be rather stationary and do not migrate seasonally. They are excellent jumpers able to clear two and one half meters. A herd generally consists of females with young and younger males numbering anywhere from 6 - 40 animals. The strong males join the herds only during mating season; otherwise they live in bachelor groups. Gestation lasts 7-8 months. The cover art is by Randell Herren, a keeper at the San Diego Zoo. Thanks, Randell!

# Scoops and Scuttlebutt

## AKF Seeks Hand-Rearing Articles

The editors of *Animal Keepers' Forum* would like to solicit the membership for articles on hand-rearing to be included in a special issue dedicated to this topic. Articles, both long and short, are welcome, dealing with all aspects of hand-rearing - diets, special feeding techniques, behavioral considerations, housing, etc. We hope to be able to designate the December 1992 issue for this topic. Therefore, we ask you to submit your hand-rearing articles no later than 25 October 1992.

## Awards Committee Seeks Members

The AAZK Awards Committee Chair, Janet McCoy, Washington Park Zoo, Portland, OR is seeking interested Professional AAZK members to serve on the Awards Committee for 1993. Committee members independently review nominations for the AAZK Awards: the Jean C. Hromadka Excellence in Zookeeping, Meritorious Achievement, Certificate of Excellence for Keeper Education, and Excellence in Exhibitory Renovation awards. If you are a Professional member and would like to be on this committee you are asked to submit a letter of interest and a short resume to Janet at the following address: Janet McCoy, AAZK Awards Chair, Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221.

## Update on Research Grant Award

*submitted by Susan M. Barnard, Research/Grants Committee Chair, Zoo Atlanta*

A big congratulations and an apology are due to Lisa J. Fitzgerald, Research Technician at the Dallas Zoo. We failed to announce that Lisa is the co-investigator on the newly funded research project, "Detection of Estrus in Gunther's Dikdik (*Madooqua guentheri*) through Urinary Hormone Analysis". John Hnida and Lisa received \$750 from AAZK, and Lisa will be taking over as the principal investigator. Although John will continue to contribute to the project, he will begin graduate work at the University of Mexico. Good luck to both of you, and we look forward to reading all about your study in a future issue of AKF.

AAZK offers two grants, of \$750 each annually, to keepers interested in pursuing a specific zoo-related research project. Application requests should be sent to: Sue Barnard, Chairperson, AAZK Research/Grants Committee, Department of Herpetology, Zoo Atlanta, 800 Cherokee Ave., SE, Atlanta, GA 30315.



### Chapter Support Continues /Allows Purchase of AAZK FAX Machine

The AAZK Board of Directors and the staff at Administrative Offices would like to thank the following Chapters for their generous donations to the general operating budget of the Association: Mt. Tahoma Chapter, Tacoma, WA (\$100.00); Virginia Chapter, Norfolk, VA (\$132.40); and Milwaukee AAZK Chapter, Milwaukee, WI (\$100.00). Because of these and previous donations from both Chapters and individuals, the Association is on a much sounder financial footing.

We are please to announce that due to the tremendous support we have received from so many Chapters we have been able to purchase a FAX machine for the AAZK Administrative Office. This will hopefully make speedy communication even better between AO, committees, project heads, board members and individual members. The new FAX number for AAZK is 913-273-1980. We can still be reached by FAX at the previous number (Topeka Zoo), but this new number will take your message directly to the Administrative Secretary's desktop.

**AAZK's New FAX Number IS**

**913-273-1980**

## **Births & Hatchings**



Columbus Zoological Gardens & Aquarium (Powell, OH)...reports the following significant B&H for our institution:

Mammals - 0.0.2 Black and white colobus (*Colobus guereza*) [CITES II], 1.0.2 Common marmoset (*Callithrix jacchus* [CITES II] [one being hand-raised]; 0.0.1 Tree kangaroo (*Dendrolagus matschiei*) [zoo's 1st]; 0.0.1 Dwarf zebu (*Bos primigenus*) [U]; 0.1 Topi antelope (*Damaliscus lunatus*) [T]; and 2.0 Bongo antelope (*Tragelaphus eurycerus*) [T].

Birds - 0.1 Bald eagle (*Haliaeetus leucacephalus*) [E], and 0.0.2 Black-footed penguin (*Spheniscus demersus*).

Reptiles - 0.0.12 Beaded dragon (*Pogona vitticeps*) [3rd generation]; 0.0.1 Voodoo turtle (*Trachemys decorata*) [1st in any zoo, as far as we know]; 0.0.25 Plumed bascule lizard (*Basciscus plumifrons*) [zoo's 1st]; and 0.0.1 Barborus map turtle (*Graptemys barbouri*) [zoo's 1st]. submitted by Carrie Babbitt, Chapter Liaison, Columbus Zoo AAZK Chapter, Powell, OH.



## From the President.....

It is almost Fall, and that can only mean AAZK Conference time again. I look forward to renewing old friendships and meeting new keepers from all over the world in the beautiful city of San Diego. To make the conference even more special, it is our 25th Anniversary. From humble beginnings, operating out of garages and automobile trunks, our Association has grown to encompass almost 3000 individuals.

The San Diego AAZK Chapter has put together an educational and informative week for all the delegates. Papers, workshops and tours of some of the finest facilities on the west coast await your arrival. AAZK Conferences are an educational benefit, not to be missed.

During our 25th Anniversary celebration, I would like to encourage all AAZK members to think of the future. The AAZK Board of Directors, with the help of many dedicated Chapters and individual members, have worked to get our Association back on firm financial ground. While still not rock solid, we can now at least look to the future, knowing that the existence of this Association is assured.

During the upcoming months you will receive, in the Forum, a short survey regarding our profession. I encourage you to fill this out. Also included will be a section regarding the goals and philosophies of AAZK. It is important that you, as a member of AAZK, have a clear voice in where AAZK should concentrate its energies in the future.

See you in San Diego.



Ed Hansen, AAZK President  
Reid Park Zoo, Tucson, AZ



## AAZK Announces New Professional/Contributing Members

Shoshanna Abeles, Franklin Park Zoo (MA)  
Denise A. McGill, Bronx Zoo (NY)  
Eugene Hawkins, Jr., Santa Fe Teaching Zoo (FL)  
Randolph Smith, Birmingham Zoo (AL)  
Betty Lee Elliott, Memphis Zoo (TN)  
Maureen A. Fagan, Columbus Zoo (OH)  
Mark Lange, Indianapolis Zoo (IN)

Melissa Perry, York's Wild Kingdom (ME)  
Claudine Locascio, Ross Park Zoo (NY)  
Janet Adams, Sea World of Florida (FL)  
Richard B. Meek, Memphis Zoo (TN)  
Kathy L. Evans, Memphis Zoo (TN)  
Kathy Fischer, Indianapolis Zoo (IN)  
Nikki Martin, private collection (WI)

Barbara A. Heemskerk, Valley Zoo, Edmonton, AB, Canada

## Renewing Contributing Members

Charles H. Hoessle, Director, St. Louis Zoological Park, St. Louis, MO





# Coming Events

## **The 12th Annual Conference of the Association of Zoo Horticulturists**

October 3-7, 1992

Vallejo, CA

For further information, contact Fred Beiner, Marine World Africa USA, Marine World Parkway, Vallejo, CA 94589; (707) 644-4000, ext. 657; FAX 644-0241.

## **International Marine Animal Trainers Association (IMATA) - 20th Annual Conference**

November 1-6, 1992

Freeport, The Bahamas

For a packet containing further registration information, including travel, car rental, hotel, etc. please contact: Vic Charfauros, Vice Pres/IMATA, c/o San Diego Zoo, P.O. Box 551, San Diego, CA 92112 USA.

## **Joint Meeting of the American Association of Zoo Veterinarians and the American Association of Wildlife Veterinarians**

November 15-19, 1992

Oakland, CA

For more information contact: Janis Joslin, DVM (AAZV), Woodland Park Zoo, 5500 Phinney Ave. N., Seattle, WA 98103 (Phone 206-684-4873), or David Jessup, DVM (AAWV), International Wildlife Veterinary Service, Inc., P.O. Box 1413, Orangeville, CA 95622 (Phone 916-355-0124).

## **The AAZPA School for Professional Management Development for Zoo and Aquarium Personnel and Applied Zoo and Aquarium Biology**

February 7-11, 1993

Oglebay Park, W. VA

For further information contact: AAZPA, Oglebay Park, Wheeling, WVA 26003-11698.

## **The AAZPA Conservation Academy March 16-20, 1993**

The AAZPA Conservation Academy will offer classes on Studbook I and SSP Coordinator Training. For further information or an application, contact Debra Boyster, AAZPA Conservation Academy, St. Louis Zoo, Forest Park, St. Louis, MO 63110 (314) 781-0900, ext. 297.

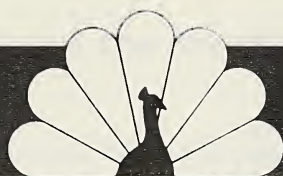
## **International Conference on Tortoise & Turtle Conservation**

July 11-17, 1993

New York, NY

Sponsored by the American Museum of Natural History's Turtle Recovery Program and the New York Turtle & Tortoise Society. For further information write to: Craig Vitamenti c/o The New York Turtle Trust & Tortoise Society, 163 Amsterdam Ave., Suite 365, New York, NY 10023 or call (212) 459-4803.





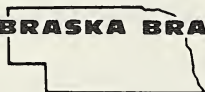
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# American Zookeepers Offered Chance to Study Mountain Gorillas in Rwanda

The Digit Fund has announced that the Rwandan government has approved a Zookeeper Program enabling an American zookeeper to study the endangered mountain gorillas in Rwanda's Parc National des Volcans. In order to become more aware of gorilla behavior and environmental needs, one zookeeper per year will be permitted to work at the Digit Fund's Karisoke Research Center for a three-month period of either Sept/Oct/Nov. or Jan/Feb/March.

Rwandan government fees for this privilege are \$3,000 for three months; and costs for room and board at Karisoke are \$600.00 for the three months, payable to the Digit Fund.



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In addition to gorilla and environmental observation, the zookeeper will assist resident researchers with their studies, help compile reports on "adopted gorillas" for "adoptive parents", possibly assist with habituation of gorilla groups, and work on camp activities as requested by the director.

The Digit Fund is grateful to the Rwandan Parks department for their authorization of the Zookeeper Program. In return, the Rwandan government seeks a cooperative program for a Rwandan park employee to spend three months studying at a U.S. zoo. Any zoo interested in participating in this program by offering an opportunity to a Rwandan should contact the Digit Fund, 45 Inverness Drive East, Suite B., Englewood, CO 80112; (303) 790-2349.

Charlene Jendry of the Columbus Zoo, Powell, OH, has been selected as the Program's first zookeeper. She will begin her tour of duty at Karisoke Research Center this month. Zookeepers may apply for the 1993 Program by writing to the Digit Fund. A formal letter of application must be accompanied by a CV and a biography. Applicants should be willing to assist the Digit Fund upon return from Karisoke by making presentations to organizations and school groups through membership on the Fund's Speakers Bureau.



## Information Please

We are interested in building a treat dispensing device for giraffe which would allow us to do daily public feedings. The device should be able to hold pieces of carrot, apple, onion, lettuce and celery since these are readily available to us. The trick will be to contain the food item in something that would also allow the giraffe's tongue to pass through, grasp the item and remove it.

Our exhibit is enclosed by chain-link fence and vertical pillar pole fencing. The front of the exhibit has a concrete moat with river rock slope. If anyone is currently using a system that might work with these kinds of treats or has some creative ideas, we would love to hear from you. Please submit drawings or ideas to: Lee Houts c/o Sacramento Zoo, 3930 West Land Park Drive, Sacramento, CA 95822-1123.





# Ngare Sergoi Rhino Sanctuary Update

## The Official Opening of the Ngare Ndare Fence



*by Ian H. Craig  
Management Committee  
Ngare Sergoi Rhino Sanctuary  
Isiolo, Kenya*

On completion of the Ngare Ndare Forest fence it was requested by Dr. Leakey that the fence be officially "Turned On" by the British High Commissioner, Sir Roger Tomkys.

Invitations were circulated to all the donors, Government Officials, land owners and small scale farmers benefiting from the fence. The plan and objectives of the fence were broadcast on the National News and there was press coverage in the Nation newspaper.

The ceremony was extremely well attended and started promptly at 11 o'clock at the Ethi Polytechnic situated alongside the fence at the southwest corner. The guest of honor was welcomed by a school choir who sang songs praising the welfare of all the different animals in the forest and welcomed Sir Roger to their school.

The meeting was opened by the local District Officer who explained how the fence had benefited his community and what complete success was obtained in keeping wildlife from destroying small-holder crops. He also explained how initially people had been wary of the fence idea as they feared that they would no longer be able to collect firewood and graze their cattle, however this fear was unfounded and everybody was extremely happy with the concept and he thanked all the different people who had donated money and time to make it all possible.

Dr. Richard Leakey, the Director of Kenya Wildlife Service (K.W.S.) then spoke, partly in English and partly in Swahili. He explained to the gathered crowd the history of the plan to build the fence and how the money had been raised by AAZK and coordinated by Andy Lodge and the Ngare Sergoi Support Group. He also explained how the Kenya Army had cleared the line and the British High Commission had provided 9000 fence posts. He went on to explain how important that now the fence had been built that it must be carefully maintained and this relied on the goodwill of all the local people. He specifically spoke to all the mothers as they were the people who had suffered from the wildlife and it was for them to make sure their children did not tamper with the fence, which in turn would mean the elephants would once again destroy their crops. He thanked all the large land owners for their contribution of maintaining their respective sections. He closed his speech with a statement that this was the first of many fences that K.W.S. planned to build and as a pilot scheme he was most impressed with the success of this fence and he planned to put a similar fence right round Mt. Kenya. This was warmly applauded by the crowd.

The British High Commissioner, Sir Roger Tomkys, then spoke. His message was that he was very impressed to see so many different people and organizations pulling together towards a common cause that was such a obvious success. He stated that his Government was very pleased and proud to have been able to participate in this project. He wished the ongoing maintenance teams luck with their work and thanked everyone for inviting him to the ceremony.

The people now moved to the official opening of the fence where Sir Roger turned on the power unit and unveiled a small plaque stating the donors and completion date of the fence.

All told the ceremony went very well and the number of people present showed how this project is working and is appreciated by both the local people and the administration.





## ATTENTION ALL AAZK MEMBERS!!

As the AAZK Historian it is my pleasure to introduce to you the 25th Anniversary commemorative book on the history of the AAZK entitled Zoo and Aquarium Professionals: The History of AAZK. This book recounts the founding story as well as the history of chapters, conferences, committees, projects, etc.

During the Ice Breaker at the San Diego Conference (Sunday, 27 Sept.) there will be a 'Book Signing' by those Founders who are present. Don't be left out of this special event! You will be able to take home a unique remembrance of this silver anniversary year.

There is going to be a limited number of book published, so after they are gone we don't anticipate another printing. There will be member and non-member prices. The price will be determined when all donations have been collected for the printing costs. Following the Conference there will be mail order purchasing available. Watch AFK for details.

See you in San Diego!

Rachel Watkins Rogers, AAZK Historian



# DOWN UNDER

By  
Judie Steenberg, Keeper  
Woodland Park Zoo  
Seattle, WA

DOWN UNDER.....is an information column about Australasian animals. While there are a number of Keepers who work in Australasian Units, or routines, often times a Keeper will have a few species

of animals from the Australasian zoogeographical region on their string or routine. It is hoped this section will contain information on birds, mammals and reptiles.

This column is intended to:

- share experiences and information to improve the care and management of Australasian animals.
- seek information and advice on problems that occur.
- serve as a forum through which to make comment, to ask questions, to critique, or to verify information.

Please send your materials (a question, a paragraph or an article) directly to Animal Keepers' Forum, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606, Attn: Susan Chan.

The following are two abstracts from papers dealing with Australasian species. Information is included as to the original publication source as well as where to contact the authors for further information and/or copies of the full papers.

## A Technique for Obtaining Early Life History Data in Pouched Marsupials

from Zoo Biology 10:81-86 (1991)

By Miles Roberts and Frank Kohn, Department of Zoological Research, National Zoological Park, 3000 Connecticut Ave. N.W., Washington, DC 20008.

Early development and demographic events in many marsupials occur in the mother's pouch out of animal managers' sight. Because pouch examination is perceived as being stressful both for animal and handler, the pouch has proven to be a formidable physical and psychological barrier to the study of early life history events in marsupials in zoos. Demographic and developmental data such as litter size at birth, secondary sex ratios, infant mortality rates, and early rates of growth and development, normally considered essential information for the development of breeding programs, are therefore essentially unavailable for most zoo populations of marsupials. Here we describe a technique for the safe and non-stressful examination of pouches of small (<2 kg) marsupials that enables the capture of such data. The technique, involving the use of transparent plastic tubes of slightly different diameters for restraining the animals and an otoscope for examining the pouch and its contents, has been very successfully applied to life history studies of four species at the National Zoological Park: *Pseudocheirus peregrinus*, *Petaurus breviceps*, *Philander opossum*, and *Chironectes minimus*.

Address reprint requests to Miles Roberts at address shown above.



## **Vaccination against lumpy jaw and measurement of antibody response in wallabies (*Macropus eugenii*)**

By D.R. Blanden, P.R. Lewis, G.R. Ferrier, Monash University, Melbourne, Australia  
from *Veterinary Record*, July 18, 1987 121:60-62.

Successful protection against lumpy jaw disease in a colony of captive wallabies (*Macropus eugenii*) was induced by vaccination with a commercial ovine footrot vaccine \*. No mortalities attributable to lumpy jaw were observed in 69 vaccinated animals while six of 42 unvaccinated control wallabies died of the disease. Vaccinated animals exhibited significant increases in antibody titres to *Bacteroides nodosus* after the first and second doses of vaccine. Titres were measured by an enzyme-linked immunosorbent assay.

\*Footvax® to Strain - produced by Coopers Animal Health NZ Limited, 33 Whakatiki St., Upper Hutt, New Zealand 61 176100 1. Distributed by Coopers Animal Health Inc., Kansas City, KS 66103-1438, U.S.A.

Address reprint requests or for further information contact D.R. Blanden, Dept. of Anatomy or P.R. Lewis, Dept. of Physiology, Monash University, Melbourne 3168 Australia.



## **Behavior and Management of Captive Chimpanzees: Organization of a Workshop**

*submitted by L. Brent, Southwest Foundation for Biomedical Research*

An informal gathering was recently held during the 1992 American Society of Primatologists (ASP) Meeting, in Toronto, Ontario, to discuss the interest in organizing a workshop about captive chimpanzees. Fifteen people were in attendance, representing a variety of laboratories and zoos. The following points were agreed upon:

\*A better communication network between persons involved with the management of captive chimpanzees would provide more effective and responsive care and research efforts.

\*A yearly workshop was agreed upon, taking place in conjunction with the annual ASP meeting. Tentative plans have been made to hold the first workshop the day before the 1993 ASP Annual Meeting. Formal arrangements with the American Society of Primatologists will be handled by Dr. Joe Erwin.

\*Although any interested individual is welcome to participate, the focus of interest for the meeting will involve issues of captive chimpanzee behavior and management. Encouraged to attend are those who work with chimpanzees in zoos, laboratories and in the field. Funding for interested people to attend the meeting was discussed, but decided not to be feasible for the first year.

\*The meeting will be conducted as a workshop, with plenty of time for discussion. The agenda will include short reports from several facilities on their program, two main workshop topics, and action or consensus issues. The workshop topics for 1993 will be introductions of chimpanzees (including mixed age and infant adoptions) and chimpanzee behavioral training through operant conditioning.

Questions or comments may be directed to: Linda Brent, Southwest Foundation for Biomedical Research, P.O. Box 28147, San Antonio, TX 78228, (512) 674-1410.



# U.S. Funds Efforts to Relocate Elephants Caught in Zimbabwe Drought

The U.S. will provide \$200,000 in emergency relief for African elephants in drought-stricken southeastern Zimbabwe. The funding will support a relocation effort underway by the Zimbabwe government to move about 400 elephants to areas where food and water are more plentiful.

The action comes at the request of the Zimbabwe government, which appealed for funds under the United States' African Elephant Conservation Act (AECA). The act, administered by the Fish and Wildlife Service, provides grants to African countries for elephant population management and conservation.

The elephants are being moved from Zimbabwe's Gonarezhou ("Home of the Elephant") National Park to surrounding farmland. The country's worst drought in decades has left the park nearly devoid of vegetation, with little remaining surface water for elephants and other wildlife. About 5,200 elephants, almost double the number the park can sustain, are competing for food and water with other wildlife. Conditions are so severe the Zimbabwe government has been forced to thin the elephant herd to prevent drastic losses and permanent damage to the park's wildlife habitat. The U.S.- supported relocation effort is reducing the number of elephants that must be culled from the herd.

Meat from culled animals is being distributed to local communities whose people are facing severe food shortages. Area farmers, whose livestock and crops have been decimated by the drought, have agreed to refrain from grazing cattle on their land and to allow wildlife to repopulate the region.

Elephants, most of them young animals, are being tranquilized and moved by truck. U.S. assistance will provide the Zimbabwe Department of National Parks and Wildlife Management with funds to contract for aircraft, helicopters, and transport vehicles, and for the purchase of tranquilizer drugs and equipment, and food and water for the elephants until they are released. The Zimbabwe government will provide personnel and additional funding for the move. The effort is expected to take about 60 days.

>Department of the Interior News Release - August 3, 1992



## \$75,000 Raised for Tropical Habitat Purchase and Protection (Ecosystem Survival Plan Update)

This year \$75,000 has been raised by the Ecosystem Survival Plan (ESP) for the purchase and protection of threatened and endangered tropical habitat. Forty (40) zoos and aquariums across the United States and Canada, through their participation in the Ecosystem Survival Plan's Conservation Parking Meter and Adopt-An-Acre programs, have set aside 2500 acres of rainforest land in the Rio Bravo Conservation Area in Belize and La Amistad National Park in Costa Rica. Twenty-two (22) zoological institutions have unveiled the Conservation Parking Meter and plans to produce another 80 meters are presently underway.

The Adopt-An-Acre program is proving to be a very important conservation component for keepers and zoo educators conducting environmental outreach and teacher rainforest workshops. An ESP workshop is scheduled to be held in San Diego this month at the National AAZK Conference.

Some zoos and aquariums have received financial support from local state chapters of The Nature Conservancy for placing Conservation Parking Meters in their institutions. For further information about the Conservation Parking Meters or the Adopt-an-Acre program please contact: Norman Gershenz, San Francisco Zoological Garden, 1 Zoo Road, San Francisco, CA 94132 - (415) 753-7042.



DO YOU HAVE A PIECE OF THE PUZZLE?

The Zoo Infant Development Project needs your piece; a weight  
an observation  
an article,  
any one piece will do.

This last month Ann Stevens of the Dallas Zoo, Patricia Pearthree of the Indianapolis Zoo, Heather Lewis of the Wildlife Safari, Rita Buice of the Dallas Zoo and Cyd Mayer of MEDARKS all sent their piece of the puzzle, won't you?

If you'd like to participate please send information or inquires to:

Harmony Frazier-Taylor  
AAZK ZIDP Coordinator  
Woodland Park Zoo  
5500 Phinney Ave. N.  
Seattle, WA 98103  
(206) 684-4866  
FAX 684-4873

Deadline is October 31, 1992

We're looking for your piece!

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## Aquarium to Study Bluefin Tuna in First-Ever U.S. Rearing Project

The New England Aquarium is currently attempting to rear juvenile Atlantic bluefin tuna (*Thunnus thynnus*), the first of this species ever to be cared for in a U.S. aquarium. This project is significant because, like sharks, these migratory giants are believed to be on the decline due to overfishing.

Bluefins, which can reach maximum weights of 1500 pounds, are prized by commercial and sports fishermen because of their size and market value. This may have contributed to the decline of the species which has been documented by the International Commission for the Conservation of Atlantic Tunas as upwards of 90% since 1970 -- a decline as dramatic as the African elephant.

Two young bluefins collected off the Virginia coast are currently being raised in the Aquarium's Animal Care Center. This is the initial phase of a long-term commitment to raise wild-caught juvenile bluefin tuna and to develop techniques for rearing and maintaining larval, juvenile, and adult tuna. By the end of this summer, Aquarium officials hope to have a school of approximately 30 bluefins in their care. According to Curator of Fishes, John Dayton, "The bluefin tuna project has long-term implications for the scientific understanding of a little-known species which is of interest to both scientists and the fishing industry." Dayton added that the survival of the bluefin is important to the integrity of the ocean ecosystem.

Throughout August, Aquarium marine biologists used techniques they developed specifically for this project to maintain bluefins collected off Cape Cod, MA. These tuna will be reared and studied at the Aquarium in the fall. This project is partially funded by the National Marine Fisheries Service. --Andrea Conley, New England Aquarium, Boston.





# NAIROBI NATURALLY: A Zookeeper's Guide to the Natural Attractions of Kenya's Capital

By  
*Robert Berghaier, Supervisor  
Philadelphia Zoo, Philadelphia, PA*

## Nairobi National Park

On the outskirts of Nairobi, literally twenty minutes by car from the site where Kenya's parliament sits, lies one of the great wildlife parks of the world - Nairobi National Park. Unfortunately, most visitors to Kenya spend only a few hours in the park. Many of these tourists and some conservationists dismiss it as being just a large outdoor zoo. A zoo it most certainly is not.

Though the park itself is only 44 square miles and fenced along its northern border, the wildlife found there can pass unhindered to the Masai grazing lands of the Athi Kapiti Plains to the south. Most of Kenya's large mammal species, with elephants being the notable exception, are found within its boundaries. The easily recognized grazing animals such as giraffes, zebras, impalas and wildebeest are common here. Although less common, glimpses of the large predators like lions, leopards and cheetahs, will reward the diligent and patient observer. This is truly what makes Nairobi National Park such a treasure - that, almost within sight of the tall buildings of the city, predators and prey carry out their age-old relationships. There is no other nation that can boast of having such a natural ecosystem so close to its capital.

Nairobi Park has other attractions besides its cats and plains game. The park's population of the nearly-extinct black rhino has grown to over 50 animals. It is, in fact, the easiest place to see these fascinating creatures in all of East Africa. One morning I was fortunate to see six different individuals, including three adults, sunning themselves together on the open savannah. Contrast this to the not infrequent occurrence of driving through a park like Amboseli for a whole day without a glimpse of one.

Since the park is a diverse mosaic of forest, grasslands, bush, streams and pools, it has an amazing number of different bird species found within its borders. The bird list for the park records over 300 types. Mammals are also well-represented with more than 30 species listed with antelopes, Cape buffaloes, baboons and vervet monkeys being among the most common. During three visits to the park in the fall of 1989, I saw 19 different species.

Since the park is so close to Nairobi, visits can be easily arranged. Several packaged bus tours include half a day in the park with the other sites. I would recommend renting a car for an entire day's visit. Driving oneself is possible, but I found that a driver allowed me to spend more time looking for animals. Compared to the cost of a car hire, the added expense of a driver is minimal. The cost of a car and driver is slightly more than \$100 US per day.

There are many excellent guide books to the park available in the newsstands of any large hotel or in a bookstore. Purchase of a book allows a visitor to map a route along the park's extensive road network. In good weather nearly every section of the park is accessible to normal passenger cars. During wet weather the southwestern area should be avoided. This region is covered with the so-called "black cotton soil". When it rains this substrate takes on the color and texture of molasses and becomes virtually impassable. I tried traveling along a road in this area after a thunder shower on one of my visits. The little Renault sedan slid back and forth along the road reminding me of driving through snow without snow tires. The black soil stuck to the car's tires and body like rubber cement.

## Nairobi Naturally, *Continued*

Nairobi Park can be entered through five different gates. Non-Kenyan residents pay about \$5 US per person, with an additional fee charged for a vehicle. There are three areas in which a visitor can get out of their vehicle. I suggest that park visitors stop first at the Cal-Tex hut picnic site. Perched on the edge of an escarpment, the hut provides a sweeping vista north to the city of Nairobi, east to the open grasslands and south to the Masai cattle ranches. From this overlook, a scan with a good pair of binoculars will point out where wildlife is concentrated on the plains below. During one such viewing I saw several lions pulling down a wildebeest for a kill. On another I saw a rhino and calf. The vantage point allowed me to plan a route that got me close enough to photograph them.

A second area is the Hyrax Gorge and picnic site. This area overlooks a deep ravine in which a large baboon troop lives. They are usually in sight and always heard. Found along the walls of the ravine are hyraxes - small, groundhog-like animals whose closest living relative is thought to be the elephant. Waterbuck and bushbuck, two types of striking antelope, are often observed nearby.

At the far southeastern end of the park is the third area - the Athi River Trail. It provides a rare experience in Africa - a chance to walk in a game park, something which is generally forbidden in other parks. Visitors are cautioned to proceed with care because buffaloes and the occasional rhino and lion are found along the trail. The main attraction is a small group of hippos that takes cover in the deeper pools of the river. It is best to visit the trail early in the morning before the hippos retreat up river. Other game can be seen as well. A vervet monkey troop lives near the trail's parking area and they often try to beg food from visitors. On one early morning walk, I found the hippos, the monkeys, a herd of impala and several interesting birds, including the jewel-like malachite kingfisher. There were mounds of fresh Cape buffalo droppings to remind me that other, more potentially dangerous, residents may have been about.

Large cats can be found with a combination of luck and some easily learned skills. Most drivers find out where the predators are located by asking other drivers where they have spotted them. However, there are other methods that will give an observant visitor a reasonable chance of finding them. The best clue to the presence of a predator is the behavior of the plains game such as zebras and wildebeest. It is the grazing animals' vigilance that keeps them from becoming prey. Therefore, if several antelopes or zebras are gazing at a particular spot of bush or high grass, you can be almost positive that a predator is hiding there. One should slowly and carefully examine such a spot with binoculars and usually some movement will reveal a cat.

Watching vultures can also provide a clue. It is a popular misconception that vulture circling in the air is the sign of a kill site. This, however, is not the behavior to be looking for. This is only the vultures catching hot air currents rising from the ground enabling them to take flight. Vultures landing in groups is the sign that a dead animal is present. Often the predator is still nearby, either having made the kill itself or waiting to take advantage of an easy meal. It also pays to "cheat" a little and to look at what other tourists are looking at. If a vehicle is stopped in one place for 15 minutes or more, it probably means that cats have been spotted. These methods of observation often require patience and diligence to be rewarded with a sighting. At one time I spent a long time searching and even traveling from spot to spot in my vehicle before I spotted a flick of movement and the tawny head of a lioness rising up from the tall grass.

My last visit to the park was my most memorable. It was November and the short rains had started. The "black cotton soil" roads were impassable, but travel through the rest of the park seemed unaffected. Game viewing was excellent in spite of periodic thundershowers. That day I saw three rhinos, including a mother and calf. It was also a good day for lions. We spotted a total of six. The first was one of the most handsome cats I have ever seen. He was a large male with a black mane trimmed in yellow. Amazingly he was lying down only a few feet from the road in a short grass area ideal for picture taking. Fifty yards away, six giraffes stood staring at him. It was an example that luck is often more important to spotting wildlife than skill.



## **Nairobi Naturally,** *Continued*

The other lions included a group of three females and a young male in pursuit of another lioness. This female was bleeding slightly from several wounds. She was most likely a lion from a different pride or, perhaps, a stray nomadic cat who had wandered into a territory in which she was not welcome. Members of the same pride are usually affectionate with each other. Strange lions on the other hand, are attacked and sometimes even killed. Three of the four lions gave up the chase of the injured cat. We lost sight of the fourth lioness and never learned if more fighting ensued.

Near mid-afternoon I asked my driver Jack to pass through the forested western section of the park on our way back to Nairobi. I thought that the roads in this area would be passable in spite of the rains. As we drove up the steep escarpment road, conditions were good. When we rounded a bend in the track we saw that our path was blocked by a large puddle. There was a detour to the left which Jack took. It led to an even larger puddle that he was unable to avoid, and we drove straight into it. The front of the car became stuck fast on a submerged log and no amount of pushing could free it. Our only recourse was to walk to the nearest ranger station for help.

Our hike started out uneventfully enough. Two male warthogs ran away when they saw us. Shortly after this we passed a large poisonous puff adder resting in the roadway. Snakes did not worry me. What I was most concerned about were male Cape buffalo. Old males are forced from their herd because of declining health and competition with younger males. As a result, they are short tempered, aggressive and dangerous. They often charge anything wandering in their vicinity. I remember seeing solitary male buffaloes on this road when I visited in October and fresh buffalo droppings and tracks were now all over the roadway. Ten minutes from the car we heard a snort and two huge male buffaloes that we had walked by without noticing wheeled around and ran into the forest to our left. I then tried to remember every trick that I had learned about working with large mammals during my 14 years of being a zookeeper. I picked up a long stick to carry. If a stick is held erect or to one side it makes the carried appear larger to an animal and it may scare off a possible attack. I also started whistling to announce our presence, since nearly all animals will withdraw from humans if given a chance.

When we first left the car, Jack said it would only be a few minutes walk to the ranger station. In fact, it took us nearly an hour. I am not sure if the whistling helped, but we did not encounter any more buffalo. At the station Jack arranged to have a park Landrover drive back to our car and pull it out of the puddle. It was a fitting end to an eventful day. The walk was exhilarating, but I would not want to repeat it.

## **Nairobi's Other Natural Attractions**

Usually known as a base for safaris to the great game parks of East Africa, the Nairobi area itself has several outstanding natural attractions. The first place in the city a serious naturalist should visit is the National Museum and Snake Park. The complex on the Uhuru Highway is an easy walk from where the major hotels in town are located. The museum has an excellent collection of hundreds of mounted bird specimens covering nearly all of the 500+ species found within Kenya's borders. Looking at such a vast array of material, a serious birder can take their time learning the most obscure field marks to help differentiate similar-looking species while on safari. Just to the rear of the museum is the Nairobi Snake Park which has a collection of living snakes, tortoises, lizards, crocodiles and fishes. Time spent observing its denizens would familiarize the traveler with these species before traveling to the bush or the coast. It may also provide the only look that a tourist gets at the snakes. Snakes are shy and retiring creatures and, contrary to popular belief, are rarely encountered on safari.

Flowing just behind the museum is the Nairobi River. Its wooded banks provide an accessible and rewarding birding site. Also located here is a small botanical garden with examples of several of Kenya's diverse flora. Both the museum and the snake park are open all week and charge a small admission fee.



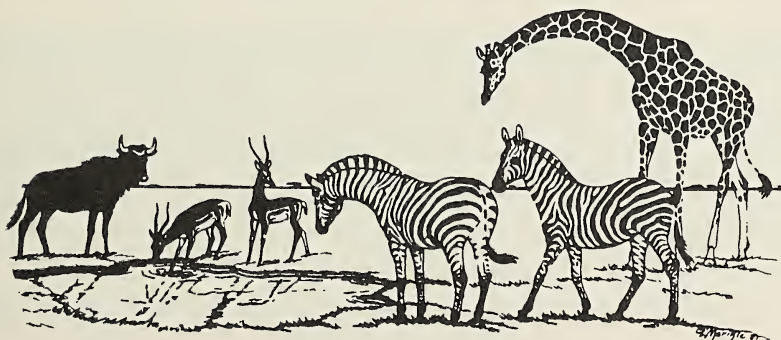
## Nairobi Naturally, *Continued*

The suburb of Karen to the west contains two natural attractions. The first is the rather touristy Langata Giraffe Center. On its property are a few of the Rothschilds subspecies of giraffe made famous by the book and telemovie "Raising Daisy Rothschild". Visitors get their biggest thrills from being able to hand-feed the giraffes. The center has recently added a nature trail where one can walk through a natural forest, encountering dik-diks and varied bird life. The center also served a more serious purpose by acting as an environmental education classroom for Kenya's school children. The center can be reached by taxi or public bus. It is open all week and an admission fee of approximately \$5 US is charged. The proceeds help run the center and assist in other conservation projects.

Nearby, but less accessible to the normal tourist, is the Ololua Forest Reserve. This area is one of the few natural forests left near Nairobi. Within its boundaries are colorful forest birds, butterflies and flowers. Leopards, bushbuck and duiker (both are types of antelope) still survive here. The forest has trails, but getting permission to use them may be a problem. The area surrounds the Kenya Primate Center which is managed by the National Museum. The museum occasionally runs bird watching trips to the forest for its members. Interested parties should talk to the museum staff to find out details for these visits. It is also possible to be granted permission to enter the Ololua. During my visit there I had the unusual experience of having a wild group of Sykes monkeys move right by me while I was watching captive groups of the same species in a large outdoor cage.

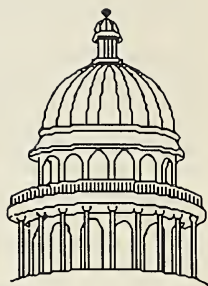
Another place near Nairobi to view wild primates is Mrs. Mitchell's Tea Plantation. It is located north of Nairobi in the suburb of Limuri and can be reached by taxi. Mrs. Mitchell's father was one of Kenya's original white settlers and she gives a colorful account of her family's history in the Kenya highlands and the tea business. She casually mentioned that two of her childhood friends were George and Terrence Adamson of "Born Free" fame. After Mrs. Mitchell's talk, a typically Kenyan "Big Lunch" & an all-you-can-eat buffet is provided. Mrs. Mitchell's property has several groups of the striking black-and-white colobus monkeys. Mrs. Mitchell pays a local man to follow and protect these spectacular creatures. She can arrange for you to spend as much time as you need to watch and photograph the colobus. A call to the plantation is recommended to determine if reservations are required or you can ask a Nairobi travel agent.

As you can see, the Nairobi area has much more to offer than just its typical role as a "one-night stand" hotel stop on the East African wildlife circuit. Taking advantage of any of its natural attractions will enhance one's visit to Kenya.



# Legislative Outlook

*Compiled by  
Phyllis Nilson-Wojcik  
Legislative Advisor*



## Norway Plans to Resume Whaling in 1993

At the International Whaling Commission (IWC) meeting in Glasgow, Scotland, June 29-July 3, Norway announced plans to resume catching minke whales in the Northeast Atlantic, regardless of IWC approval. Iceland also confirmed plans to resign from the IWC after last year's unsuccessful attempt by them to reverse the IWC's position on commercial whaling.

Commercial whaling was banned in 1986 by the IWC following the decision that whales were being hunted to the brink of extinction. The moratorium did not take effect until 1988 when the Japanese, under threat of a U.S. embargo of their fisheries products, ceased commercial whaling. Under a loophole in the international whaling treaty, Japan, Norway and Iceland have continued to kill whales for "scientific research". The commercial whaling moratorium remains in force until the completion of a comprehensive assessment of the effects of the moratorium on whale populations, and the adoption of a Revised Management Procedure.

*>Excerpted from WWF FOCUS, July/August 1992, Vol. 14, No. 4*

## African Elephant to Remain Listed as Threatened

Citing significantly reduced threats to elephants as a result of international conservation efforts, the Department of the Interior's U.S. Fish and Wildlife Service has announced that the African elephant will remain listed as threatened rather than be reclassified as endangered under the U.S. Endangered Species Act. The Service's decision still prohibits the import of African ivory into the U.S., underlining the 1989 ban imposed by President Bush under the African Elephant Conservation Act (AECA). The African elephant was reclassified on CITES Appendix I that same year.

In making its final determination, the USFWS considered more complete information on elephant conservation programs in African countries, updates on poaching activity, and reports from a CITES panel of elephant experts that became available at the CITES conference held last March. This information indicates that over-exploitation of elephants, which so severely affected their populations in the 1970's and 1980's, has been controlled through anti-poaching campaigns, assisted by the ivory ban. Many elephant populations have stabilized and some are increasing. The current African elephant population numbers approximately 600,000 animals occupying about 2 million square miles of habitat.

*>Excerpted from Dept. of the Interior News Release, 10 August 1992*





**1992  
THE AAZK CONFERENCE  
IN  
SAN DIEGO**



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***CELEBRATING YESTERDAY, ENRICHING TODAY, & SHAPING TOMORROW***

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**SAN DIEGO, CALIFORNIA  
SEPTEMBER 27 THROUGH OCTOBER 2, 1992**

## NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

**CITY** **STATE/PROVINCE**

ZIP CODE \_\_\_\_\_ PHONE ( \_\_\_\_\_ ) \_\_\_\_\_

ZOO AFFILIATION

POSITION/TITLE

AAZK CHAPTER

NUMBER OF AAZK NATIONAL CONFERENCES ATTENDED

AAZK COMMITTEE MEMBER?

PRESENTING A PAPER?	YES	NO
---------------------	-----	----

CONDUCTING A WORKSHOP? YES \_\_\_\_\_ NO \_\_\_\_\_

	YES	NO
PARTICIPATING IN ZOOLYMPICS?	YES	NO

BRINGING AN AUCTION ITEM?	YES	NO
---------------------------	-----	----

VEGETARIAN?	YES	NO	TYPE
-------------	-----	----	------

T-SHIRT?	YES	NO	SIZE	SM	MED	LG	XLG
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ARRIVAL DATE AND TIME

**EARLY REGISTRATION INCENTIVE TOUR: 1ST CHOICE**

2ND CHOICE

3RD CHOICE \_\_\_\_\_

**SRB CHOICE** \_\_\_\_\_

### CONFERENCE FEES\*

AAZK MEMBER OR SPOUSE	\$95.00
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NON-MEMBER	\$105.00	_____
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<b>LATE FEE (AFTER AUGUST 21, 1992)</b>	<b>\$10.00</b>
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TOTAL FEE ENCLOSED \$

**\*FEES INCLUDE A \$15.00 CONTRIBUTION TO AAZK NATIONAL.**

**PLEASE CONTACT THE AAZK CONFERENCE HOTLINE FOR ADDITIONAL  
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# 1992 AAZK NATIONAL CONFERENCE

SAN DIEGO, CALIFORNIA  
SEPTEMBER 27 THROUGH OCTOBER 2, 1992



## HOTEL REGISTRATION FORM

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE/PROVINCE \_\_\_\_\_

ZIP CODE \_\_\_\_\_ PHONE (       ) \_\_\_\_\_

ARRIVAL DATE \_\_\_\_\_ CHECK-OUT DATE \_\_\_\_\_

I WILL BE PAYING BY:              CHECK \_\_\_\_\_ CREDIT CARD \_\_\_\_\_

(First night's deposit or credit card guarantee is required).

ROOM GUARANTEED BY:    VISA \_\_\_\_\_ MC \_\_\_\_\_ AMEX \_\_\_\_\_

CREDIT CARD NUMBER    \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

NAME AS IT APPEARS ON CARD    \_\_\_\_\_

EXPIRATION DATE    \_\_\_\_\_

\*\*\* CONFERENCE ROOM RATE (Including 9% room tax):

\$98.10 per night    1 to 4 people per room

Rooms for the AAZK Conference are being held until August 21st. Any reservations made after that date will be on a space available basis only.

A 24-hour cancellation notice is required for deposit refunds.

Check-in time is 4:00 p.m. Check-out time is 12:00 noon.

To make reservations by phone, dial 1-800-288-0770.

Most rooms have two double beds, sleeper sofa, and kitchenette. King-size rooms are available on a request basis only.

Parking at the Catamaran is free for those registered at the hotel. For those not staying at the hotel, there is a \$4.00 per day parking fee.

Please return this form to:

CATAMARAN RESORT HOTEL  
RESERVATIONS  
AMERICAN ASSOCIATION OF ZOO KEEPERS  
3999 MISSION BOULEVARD  
SAN DIEGO, CA 92109

# THE MOTHER OF ALL AUCTIONS

Just when you thought you had finally saved enough money for this conference.....We feel it is only fair to warn you that we have accumulated an outstanding collection of auction items to rival past conferences. Included are signed lithographs by Charles Frace and Albert Gilbert, signed posters by Robert Vavra and Art Wolfe, signed photographs by Tom Mangelson and Ron Sion, a bronze rhino bust by AAZK Founder Ken Willingham and a multitude of books, posters, patches and stamps. Just because you had to beg, borrow and steal to come to San Diego, doesn't mean you can't scrape up a few more bucks for our silent and live auctions. Besides, we accept Visa and Mastercard.

---

## CALL FOR ROOMMATES

Our deluxe accommodations comfortably sleep four delegates, and most rooms include two double beds, a sleeper sofa, and a kitchenette. If you would like assistance in locating roommates for the conference, contact Katy Wallis at (619) 538-9177.

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## ROSH HASHANAH

Those delegates wishing to observe Rosh Hashanah in San Diego may contact Terri Peterson at (619) 231-1515 extension 4416 for information.

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## ATTENTION ZOOLYMPIANS

Participation in "The Best of the Zoolympics" in San Diego will be limited to a manageable number of five-person teams. Serious enthusiasts should be prepared to sign up early upon arrival at the hotel. We are anticipating extensive participation and media involvement. This year Zoolympics will be held Thursday, October 1 from 4:00 - 6:00 PM, following a day of paper sessions and meetings. The Catamaran Hotel has a large area of grass, sand and water on Mission Bay that can be incorporated into several events. This year we want to offer "The Best of the Zoolympics", choosing from past events over the years. In addition, we would like to add a Sea World-style event, incorporating the water's edge.

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## DAILY RATES AVAILABLE

NOTE: Please refer to the July issue of AKE for the Conference Agenda.

SUNDAY:	\$20
MONDAY:	\$35
TUESDAY:	\$30
WEDNESDAY:	\$30
THURSDAY	\$20
FRIDAY:	\$50

BEACH PARTY ONLY:	\$23
FINAL BANQUET ONLY:	\$32



# The Elderly in the Zoo

By  
G. Mitchell, Ph.D., Professor of Psychology  
and  
C.T. Tromborg, M.A., Dept. of Psychology  
University of California, Davis  
Davis, CA

## Summary

Zoos attract elderly people, more females than males because females outlive males. The elderly come to the zoo alone or accompanied by families with children. The zoo is a more attractive public place to senior citizens than other public places such as malls. Animals, including some nonhuman primates, often respond to visitors with threats but they are much less likely to threaten senior citizens. The senior citizens, in return, are much less likely to harass the animals. The opportunity exists for keepers to play a role in educating potential zoo visitors about appropriate deportment around wild animals in captivity. Further, the lives of the elderly can be enriched through their contacts with animals and children in this environment.

## Introduction

Many facets of zoo keeping have been acknowledged by the *Animal Keepers' Forum*. The Human-Animal Bond is but one facet. Companion animals and their roles with different special human populations have been looked at extensively within the community of veterinarians. The elderly are important subjects of study for such programs.

Older people are very positively affected by interactions with pets. Lowered blood pressure and decreased heart rate are but two side effects. But how do the elderly respond to animals that they can see but cannot touch, to animals which are not pets? How do they respond to wild animals and to animals in the zoo?

The state of California has an enormous number of zoological parks and aquariums. California also has the largest, and a rapidly growing, population of elderly people. The timeliness of these two basic developments should not be overlooked by the zoo keepers and others involved in care of zoo animals. There is an opportunity for keepers to communicate with large segments of the maturing public. Zoos are attended by far more people than all major athletic events combined. Public relations opportunities abound.

The Human-Animal Program at the School of Veterinary Medicine at UCD held a symposium in 1988 entitled "Our interactions with wild animals". In this symposium it was made clear that one need not touch animals to be positively affected by them. Fish swimming in aquariums (Publication of the Human-Animal Program, 1988) and birds singing in gardens (Dawson, 1988) are two of many very common examples of such stimuli having positive effects on people. In today's increasingly well-designed and more naturalistic zoos, visitors see wild animals in ways that encourage them to think of these creatures as capable and wonderful representatives of their species rather than as curiosities. The visitor can learn respect for the animals (Markowitz, 1988). People, including the elderly, travel great distances just to experience wild animals, and many elderly people volunteer (e.g. docents at zoos) in interacting with and assisting in maintenance of wild animals. Such people say that their lives have been enriched by this experience (Hart, 1988).

## Demographics

We, and others, have completed demographic studies on people who visit zoos (Joslin et al, 1986; Mitchell and Jones, 1990; Mitchell et al, 1990a). Our own studies, which were in

## **The Elderly at the Zoo, Continued**

agreement with those published by others, noted that more senior citizens were found in parties of people at zoos than at malls. Even on weekdays, when senior females in particular were most likely to be found in malls, zoos attracted more senior females than did malls.

Also, in zoos party sizes were larger than in malls and these larger parties more often included seniors. Seniors appeared on weekdays, unlike young adult males who appeared primarily on weekends. Seniors were more often seen in the company of children when at the zoo than when at malls, but even in the absence of children, senior citizens were seen in more groups in zoos than in malls.

We took six samples of zoo visitors in 1987 and 1988 at roughly three month intervals to get a reliable estimate of the proportion of zoo visitors that were mature adults. We used trained observers who had completed courses in research methods and statistics to categorize people by age and sex. Anyone deemed by these observers to be over 50 years of age was considered to be a mature adult or senior (this is the American Association of Retired Persons age criterion). The agreement as to age by the trained observers was quite good (Cohen's  $kappa > .75$ ).

Overall (across all six samples), we have classified 21,346 visitors by age and sex. Of these, 12,337 were adults and, of these adults, 1,305 were senior citizens. These seniors included 828 (63%) females and 477 (37%) males. Senior females made up only 3.9% and senior males only 2.2% of the total visitors to the zoo. Despite these small percentages we still saw a greater percentage of seniors in zoos than in malls.

Currently, seniors represent around 7% of the visitors attending zoos, but with the graying of California's population these percentages of seniors will increase faster than will the percentages of other age groups. Zoos, like all other public places, must be prepared for this demographic change. There is a place for zoo staff in making the human-animal programs in zoos a more positive experience for greater numbers of our aging population.

### **Response to zoo animals by the elderly**

Aside from special volunteer programs at zoos (docent programs), adopt-an-animal programs, and zoological society memberships in which seniors are probably over represented, seniors are a unique class of visitor.

Like all visitors they show tendencies to visit animal exhibits that are closer to entrances, exits, and main paths (Mitchell et al 1990a). But they are quite different from all visitors (excluding infants and toddlers) in another important aspect of their behavior in the zoo - in how they respond to the animals.

In our studies of human-animal interactions at the Sacramento Zoo, we have selected as our animal subjects some primates which tend to elicit active visual and vocal interactions from visitors. The golden-bellied mangabey (*Cercocebus galertus chrysogaster*) is an irascible Old World monkey that is more responsive to people than is any other animal in this zoo (Mitchell et al, 1988). If we wanted to study human-to-animal harassment in this environment, and we do, we could pick no animal better suited for the topic. These mangabeys are more frequently harassed by visitors than any other animal in the zoo.

In comparing rates of harassment of these animals by visitors, of various age and sex categories (Mitchell et al, 1991), we discovered three things: (1) Male visitors harassed more than did female visitors, (2) children of toddler age and younger never harassed, and (3) senior citizens almost never harassed these animals. In one study, for example, we saw only one clear case of a senior citizen bothering a mangabey whereas we counted 28 harassments by younger women and 38 harassments by younger men (Interestingly, most of the harassments by men were towards mangabey males and most by women toward mangabey females).

## The Elderly at the Zoo. *Continued*

So, while seniors were not as numerous in the zoo, their behavior was more appropriate. In respect to absence of animal harassment the behavior was almost impeccable. In informal observations at other exhibits we saw the same pattern (Tromborg, 1986).

### **Behavior of the zoo animals towards the elderly**

In our studies of the mangabeys' responsiveness to visitors, seniors were threatened much less frequently than other adults by these animals. The golden-bellied mangabey adult males in particular, (the animals who most commonly threaten visitors) threatened senior males and females significantly less often than they threatened younger adults or children over three. Male mangabeys rarely threatened senior males, whereas they almost invariably threatened younger adult male visitors and only occasionally threatened senior females. Female mangabeys threatened visitors less often than males but nevertheless more than did other species. The females did not seem to make distinctions between the ages of visitors as much as male mangabeys did.

The male mangabeys did not threaten the elderly as much as other age groups at least partly because the elderly did not harass them. It is understandable that highly excitable animals might threaten more when visitors throw food into the cage, climb the fence or railing, lean over or reach toward the animals, yell, throw objects at the animals, get too close with a camera, imitate the animal, make animal-like sounds, wave hands at the animals, jump up and down, snap fingers, clap, kick or hit the fence, make faces, wear a mask or do any of many other forms of what constituted harassment or inappropriate zoo visitor behavior. Only non-senior adults and children over the age of three did such things. Seniors ( and toddlers) did not.

These demographic and human-animal interaction studies suggest that the zoo might be an excellent place for the concepts of positive human-animal interaction to be taught, if only by example. It is obvious that all visitors except seniors and toddlers need to learn more appropriate behavior around, and much greater respect for, wild animals in captivity. The zoo might also be an excellent place for the study of grandparent-child-animal interaction.

Zoos should pay additional attention in years to come to ways of accommodating increased numbers of elderly visitors such as more benches and larger lettering on signs. Animal keepers have an opportunity to become more involved in enriching the lives of the elderly and in improving intergenerational education concerning the dignity of our scaled, furred, and feathered friends while addressing yet another facet of human-animal interaction.

### **References**

- Coss, RG Physiological effects of viewing animals or scenery. In Our interactions with wild animals. Human-Animal Program, School of Veterinary Medicine, University of California, Davis, April 22 and 23: 3-4, 1988.
- Dawson, KJ A song in the garden. In Our interactions with wild animals. Human-Animal Program, School of Veterinary Medicine, University of California, Davis, April 22 and 23: 5, 1988.
- Hart, L. Optimizing human interactions with wild animals. In Our interactions with wild animals. Human-Animal Program, School of Veterinary Medicine, University of California at Davis, April 22, 23: 10, 1988.
- Joslin, P; Grunauer, G.; Napolitano, M. et al. A demographic profile of the zoo visitor. Annual Proceedings of the AAZPA, Sept. 14-18: 276-287, 1986.
- Markowitz, H. Enriching zoos for visitors and residents. In Our interactions with wild animals. Human-Animal Program, School of Veterinary Medicine, University of California at Davis, April 22 and 23: 15, 1988.
- Mitchell, G and Jones, PA Family parties entering the zoo or mall. Consortium of Aquariums, Universities and Zoos Monograph: 32 pp, 1990.



## The Elderly at the Zoo, Continued

- Mitchell, G; Herring, F; Obradovich, S. et al. Effects of visitors and cage changes on aggressive, sexual and play behaviors in three groups of golden-bellied mangabeys (*Cercocebus galericus chrysogaster*) at the Sacramento zoo, submitted for publication, 1991.
- Mitchell, G; Obradovich, S; Sumner, D et al. Cage location effects on visitor attendance at three Sacramento Zoo mangabey enclosures. *Zoo Biology* 9: 55-63, 1990.
- Mitchell, G; Obradovich, S; Sumner, D; et al. Comparative data on age and sex of zoo visitors. *Consortium of Aquariums, Universities and Zoos Monograph*: 12pp 1990.
- Mitchell, G; Soteriou, S; Kenney, L et al. Golden-bellied mangabeys (*Cercocebus galericus chrysogaster*) at the Sacramento Zoo: Adult heterosexual pairs. *Zoo Biology* 7: 1-13, 1988.
- Our interactions with wild animals: Perspectives and possibilities. Publication of the Human-Animal Program, School of Veterinary Medicine, University of California, Davis. April 22 and 23: 1-24, 1988.
- Tromborg, CT (Personal observation, 1986). Responses of people to primates in the San Francisco Zoo's Primate Discovery Center.



## Book Review

### Waterfowl Ecology and Management: Selected Readings

Compiled by John T. Ratti, Lester D. Flake and W. Alan Wentz  
The Wildlife Society, Inc., 1982  
5410 Grovsner, Bethesda, MD 20814  
1328 pages

Review by Ric Urban, Keeper  
Houston Zoo, Houston, TX

A great reference book! This publication offers many pieces of work which are readable. Many "selected readings" can put you to sleep using big terminology. I feel the gentlemen who put these works together have another purpose in mind. As well as being a good book for a professional library, Waterfowl Ecology and Management: Selected Readings is thought-stimulating for keepers or anyone caring for waterfowl. A sportsman or hobbyist could be stimulated enough to care for waterfowl in the off-season.

This book may even answer some burning questions one might be pondering when caring for their flock. Readings in this book cover many subjects and many decades. Surprisingly, the earliest article in 1937 deals with lead poisoning in waterfowl. Other subjects covered include: Food Habits and Food Ecology, Population Ecology, Reproductive Ecology Management, Migration and Evolution.

From the comeback of the Wood Duck to the role of hunting regulations in migratory bird management, this book tells all. While reading these articles, I occasionally drifted back to my college wildlife biology experiences. I worked with professors and graduate students through all the elements of weather to gather the data they needed to produce papers like these. I understand what is behind the scenes of this publication. For all those who were not mentioned in the articles and got passing grades for this class, I remember. I also applaud all the efforts behind this publication. It will be a well-used part of my professional library. Thank you to all the hard working individuals who, like keepers, do their jobs for the love of it and not for the money.



## **Zookeeping As A Profession?**

*By*  
*Michael S. Burton, VMD*  
*Cheyenne Mountain Zoo*  
*Colorado Springs, CO*

Webster's Dictionary defines a profession as "a calling requiring specialized knowledge and often long and intensive academic preparation; a principal calling vocation or employment; or the whole body of persons engaged in a calling". Ask any zoo keeper if zookeeping is a profession and without hesitation an overwhelming majority will answer a resounding yes. Ask them if they feel the average member of the public visiting the zoo would consider zookeeping a profession and their enthusiasm dwindles. Yet, those same members of the public would have no difficulty recognizing doctors, dentists, attorneys and teachers as professionals. What then is the difference? Is it simply a matter of public awareness?

Zoo keepers at the Cheyenne Mountain Zoo were asked to give examples of professions other than zookeeping and then were asked to list characteristics of these professions. The characteristics that were believed most important when considering the differences between a profession and other occupations were formal education, an ethical code, an oath, a professional organization and licensing. The question then is how do each of these characteristics apply to zookeeping?

In considering formal education, we first need to evaluate what this means. To some keepers a high school diploma represents formal education. To others a college degree exemplifies formal education. If we consider the example professions listed above, a college level education is the norm. When asked if this should be a requirement for the position of zoo keeper at the Cheyenne Mountain Zoo, most were receptive to this possibility. Nationally there already exist at least three college level programs that are designed specifically to educate students for the pursuit of zookeeping as an occupation.

Many keepers felt that there is an unwritten code of ethics that zoo keepers follow in their daily activities. Most were unaware that the American Association of Zoological Parks and Aquariums (AAZPA) has its own code of ethics. They were also unclear if this code of ethics applied to zoo keepers. They did agree that a code of ethics was important but were unsure if this should be an institutional code of ethics or perhaps developed by the American Association of Zoo Keepers, Inc. (AAZK, Inc.) Most felt that an oath was probably not necessary for zoo keepers.

The obvious professional organization representing zoo keepers is AAZK. However there was not unanimous support for this position. The AAZPA was also viewed by some as being a professional organization for zoo keepers. However, this did not receive unanimous support either. The concerns are that AAZK opens its membership to anyone, and AAZPA has no "professional fellow" category for keepers.

There was very little support for the concept of requiring licensing or certification for zoo keepers. The facilitator pointed out that licensing represented a means by which many professions police their members. It is not enough to have received the appropriate degree, one must demonstrate by way of national or state boards that they can apply this knowledge.

In summary it is clear that most zoo keepers are unwilling to accept that their field is simply an occupation. They believe that the requirements to be a good zoo keeper are specialized enough that it ought to be considered a profession. It also appears that they see the need for steps to improve their image as a profession to their peers and to the public.



## Viewpoint, Continued

There are many ideas to accomplish this goal - strengthening education requirements for zoo keepers; whether it be by hiring from programs which specifically train students as zoo keepers, hiring individuals with college degrees, better formalized on-the-job training (e.g. internships), keeper exchanges or continuing education. Developing a code of ethics specifically for zoo keepers and evaluating the need for an oath may be important. Zoo keepers must evaluate their professional organization(s) and be willing to voice their opinions concerning the priorities that organizations should pursue to meet the standards of their profession.

Finally, public awareness starts with you! Most visitors are uneducated about the role of a zoo keeper. When they visit the zoo they will have limited contact with the zoo keeper and are there primarily to see the animals. In most cases their image of a zoo keeper will be based on what they might see and not on what they are taught. A well-placed graphic with photographs of keepers preparing diets, presenting programs at schools, attending seminars and conferences, working on animal records, reviewing exhibit designs, etc., might be a good place to start. On-site keeper presentations, whether in a formal setting or informally answering questions and talking to visitors as you go about your daily routines will leave a lasting impression. A speakers bureau in which keepers talk to civic organizations, schools, etc. would also help in the education process.

The challenge to the profession is to develop its standard. The challenge to each individual is to uphold those standards and contribute to the development of the profession.

*The Viewpoint Column is made available for the discussion of opinions pertinent to all aspects of zoos and zookeeping. Publication of reader's opinions does not imply endorsement on the part of AKF or AAZK, nor do the opinions expressed herein necessarily reflect those of AKF and AAZK.*



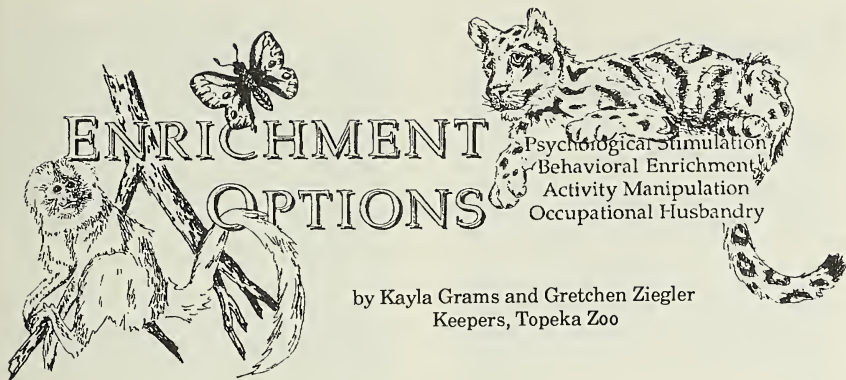
## Publications Available

Wildlife Health News, published by The North American Wildlife Health Care Center, Inc. is a monthly newspaper format publication which includes a vast wealth of information on wildlife health. In its third year of existence, Wildlife Health News includes articles on techniques to help save injured, orphaned, and sick wild creatures in your own community, and within the laws of your state. Information in many articles includes medications to use, dosages and critical timing factors in such care. Other articles include proven diets for use with hand-raising orphaned wildlife, explanations of various diseases in wildlife, tips for providing appropriate plantings, water sources, etc. for backyard wildlife. Each issue also includes updates on legislation affecting wildlife as well as more in-depth articles on specific species. Subscription rate is only \$18.00 per year for 12 issues. A complimentary issue to preview is available upon request. For a complimentary issue or to subscribe write to: Wildlife Health News, P.O. Box 155, Black Mountain, NC 28711.

Wildlife Rehabilitation Today, published quarterly by Coconut Creek Publishing Company, is an AKF-sized magazine which has been in publication since 1989. Each issue contains articles about various aspects of wildlife rehabilitation-regular features include: "how to" experiences in Rehab Anecdotes, practical medical advice from Ask the D.V.M., tour the best operations without leaving home through Facility Profile, find out what's new in Books & Videos Review, Captive Care Tips, Capture & Release Techniques, etc. They also offer a back issues index from which complete magazines or individual articles may be ordered. Subscription prices are: U.S. \$15.00 for 1 yr; 2 yrs. for \$29.00; Canada \$18.00 for 1 yr.; 2 years for \$35.00; Other Countries \$27.00 for 1 year; 2 yrs. \$53.00 (air mail). For further information write: Wildlife Rehabilitation News, Coconut Creek Publishing Company, 2201 NW 40th Terrace, Coconut Creek, FL 33066-2032 or call (305) 972-6092.







The AAZK National Conference in San Diego this month is almost upon us. One of the themes for this year is enrichment. There is sure to be many opportunities to share information and ideas about enrichment, and we hope to gather some of these ideas for our column as well. Come prepared! See you there!

**TAMARINS/MARMOSETS** - use red and yellow "Tuffy" scrub sponges. Hang from top of enclosure with red nylon cord and allow to dangle about 5" from cage bottom. They pick sponge up, throw it around and swing on cord.

--Diane Callaway, Keeper  
Omaha's Henry Doorly Zoo

**PRIMATES** - attach 3" x 3/8" eye-bolt (blunted) to one end of a 1/4" chain. Affix the other end in keeper space and feed eye-bolt high and through barrier into animal space above floor and supports. Screw corn-on-cob, celery stalk, other firm edibles on bolt and allow primates to feed. If ample chain is used it will automatically slide through barrier and out once food is consumed. Works best if barrier is made of woven mesh. Beneficial due to posture monkeys must maintain while feeding and consequential increased processing time.

--Bruce Clark, Keeper  
Toledo Zoo

**DOUROUCOULI** - handful of sand with insects.

- "Apple Sundae": 1/2 apple with middle scooped out  
1/2 banana squashed into hole  
1 grape garnish on top

**OSTRICHES** - offer bamboo browse

**EAST AFRICAN CROWNED CRANES** - provide a mound or brush pile to stand on; insects

**CHICKENS/TURKEYS** (domestic and wild) - offer insects, chopped produce.

--Betty Jean Schmitt, Keeper  
Virginia Zoological Park



# Chapter News

## Platte River Chapter

The Platte River Chapter and Folsom Children's Zoo (Lincoln, NE) are very excited to announce the arrival of our ESP Conservation Parking Meter. We earned part of the money to pay for the meter by having a garage sale, holding a raffle, and through private donations. The zoo loaned us the rest so we could have the meter here by our opening on 25 April.

We are planning a Dog Wash and other fundraisers to earn the rest of the money. By the end of July the meter had raised over \$1200.00, saving almost 10 acres of rainforest.

Four out of the seven Chapter members participated in Bowling for Rhinos again this year where we raised \$137.00. We joined the Omaha Chapter for this event and it was a very enjoyable evening.

*--Debbie Baker, President*

## Milwaukee County Zoo AAZK Chapter

Three members of the Milwaukee Chapter attended the second quarter Great Lakes Regional AAZK Council meeting at the Lincoln Park Zoo on 15 April. The meeting was hosted by Pat Swieca and the Lincoln Park Zoo Chapter. Twenty-six members of the Council were in attendance, representing seven zoos in four states.

The RC from Wisconsin submitted five items to be voted on by those in attendance. The five items that were all approved are as follows: Eliminate the January meeting because of the chance of bad weather here in the north; Have the host zoo obtain a meeting agenda in advance of the meeting; Have a sign-up sheet to keep track of those in attendance; Keep minutes of the meetings with copies going to all Liaisons, AO and LINK Coordinator; Formulate a new list of Liaisons at least once a year.

We had a surprise guest at the May meeting of our Chapter. Former member Clay Ecklund, who is now attending the Santa Fe Community Teaching Zoo in Gainesville, FL, was in Milwaukee for a visit. He is busy trying to recharter the AAZK Chapter at Santa Fe, and has been voted their Chapter President. We wish him, and the Chapter, the best of luck.

In June, Karin Newman resigned as Chapter Vice President. Chapter President Craig Berg appointed Diane Hazlett to complete the term of office.

Tim Stout, the Institutional Liaison from Jo-Don Farms in Frankville, WI attended the Chapter meeting here in July. On 29 July, Wayne and Diane Hazlett attended the third quarter meeting of the Great Lakes Regional AAZK Council at the Louisville, KY Zoo. The meeting was sponsored by Dave Hodge and the Louisville Chapter. The meeting was well attended and productive. With great food and the behind-the-scenes tours only a fond memory, we look forward to the next meeting of the Council.

The Milwaukee Bowling for Rhinos team again headed for Chicago to bowl with the Lincoln Park Zoo-sponsored event on 16 May. The team consisted of eight bowlers and one watcher (that's me). Over \$900.00 in sponsor money was also taken to Chicago by the team. The bowling scores were not great, but the pizza was. Ken Chelminiak of the Milwaukee team had a score of 246 which earned him a certificate for the highest score of the evening among the 200-plus bowlers at the event. Diane Hazlett was the top money collector from Milwaukee for the third year in a row. Our congratulations to Ken and Diane.

The 2nd Gorilla Workshop, which was held here in Milwaukee in June, was a great success. Many countries were represented, some with financial help from AAZK members who sent in donations after our appeal for help. My 'thank you' is added to that of the Gorilla Workshop Committee.

Some items are still available from the workshop while quantities last. Patches (\$4.00), coffee mugs (\$4.50), T-shirts

## Chapter News, Continued

(adult SM, LG, XLG-\$8.00, and a few XXLG at \$9.00), and posters ("At the Edge" by Jay Jachom, \$5.00, or signed by the artist, \$9.00). If interested, please send a postcard to: The Gorilla Workshop, Milwaukee County Zoo, 10001 W. Bluemound Rd., Milwaukee, WI 53226. Please include an evening phone number so that we may get back to you regarding costs of your order with shipping and applicable taxes. You may also call the Milwaukee County Zoo at (414) 771-3040, ask for Jan Rafert or FAX (414) 256-5410, Attn: Jan Rafert.

The Workshop logo consists of a family group of gorillas, with the art work by Area Supervisor of Primates Sam LaMalfa. Sam was one of the early national members of AAZK and has always been there when the local chapter needed him.

Wisconsin now has liaisons at the following institutions: Milwaukee County Zoo, Wayne Hazlett; Racine Zoo, Margit Holfinger; Jo-Don Farms, Timothy Stout; Henry Vilas Zoo, Karen Grikstas; and Ochsner Park Zoo and the Baraboo area, Alice Miser.

--Wayne Hazlett, Chapter Liaison

### San Diego Zoo AAZK Chapter

The Chapter proudly presented Mr. Jim Fowler, host of "Mutual of Omaha's Wild Kingdom" on 12 July at one of the S.D. Zoo's new "Treetops" conference rooms. A well-known naturalist, explorer and predatory bird authority, Jim Fowler has been involved with conservation efforts for the Harpy Eagle, Andean Condor and numerous other species worldwide. He has appeared in hundreds of television programs teaching conservation and sharing his vast knowledge of nature.

Jim touched on many topics ranging from the difference between wild and zoo animals (zoo animals being more unpredictable and dangerous to handle); to the "spectacular" Giant Harpy Eagle he studied and worked with in the Amazon back in 1960; his travels to the world's remote spots for the 'Wild Kingdom' TV program, and the dedication of Marlin Perkins; "field"

stories and "battle scars" from a crocodile and an anaconda; misconceptions about the wolf and mountain lion; habitat destruction; pollution; reintroduction; his recent Antarctic adventure; the role of zoo keepers; and why wildlife and wilderness are important to people in preserving the quality of life.

Mr. Fowler is currently working with his New York group organizing wildlife lectures to be used as an educational tool. All ticket sales from his talk benefitted AAZK.

On 17 July, Chapter members took off on their "Annual Photo Caravan Tour" of the Wild Animal Park's East/South African and Asian Plains/Swamp exhibits. Members fed out apple and carrot treats as they came nose-to-nose with habituated giraffe, rhino, eland and other hoofed stock.

The tour's highlights included a 10-day-old Beringo giraffe calf, five-week-old ostrich chicks, Indian/southern white rhino calves, feeding "Angalifu" - a northern white rhino, and glimpses of many deer and antelope babies.

Thanks to this year's guides Gloria Roth and Steve Coate and drivers Donna Biesek and Kim Wiebel.

In August the Chapter was pleased to present Joan Embery, Goodwill Ambassador for the Zoological Society of San Diego. As the Zoological Society's official ambassador, Joan's work includes television and radio appearances, animal presentations, and speaking engagements.

Joan has led groups to Africa, Nepal and China, written three books, and has appeared on hundreds of T.V. programs from Johnny Carson to Good Morning America. Joan has also hosted two wildlife television series, "The Animal Express" and "Animals of Africa". All proceeds from ticket sales benefitted AAZK.

Correction: July's AKF Chapter News submission on Gary Priest's lecture should read Celebes macaque not Lion-tailed macaque.

--Mary Dural, Chapter Liaison



## Chapter News, Continued

### Central Florida Chapter AAZK

On 16 April, the Central Florida Chapter (C.F.C.) hosted Sandra Skrei, Executive Chairperson of the Zoo Conservation Outreach Group (ZCOG) at Fossil Rim Wildlife Center, Glen Rose, TX. Approximately 20 guests attended the presentation (AAZK members and nonmembers). Sandra's dedication and energy for this project inspired a constructive effort, supervised by C.F.C. member Barbara Shurman, to collect needed supplies for the Meso-American Zoos.

Local animal parks and attractions were approached for help and the donations have been overwhelming. We've received cages, incubators, clothes, kitchen appliances, tools, and medical and lab supplies. Once everything is properly packaged and labeled, Barbara will deliver the supplies to Miami International Airport where the air transportation has been pre-arranged to Zoo La'Aurain Guatamula, Mexico. Some of the donations will be re-routed to Pentencio Zoo near Florez, located in the Mayan Ruins. Thanks to everyone involved in this project, and special thanks to Sandra Skrei for bringing ZCOG to our attention.

April 25 and 26, C.F.C. went to Florida's Wekiva Springs State Park for the "Celebration of the Great Outdoors". Many local groups and organizations contributed to the festival, including Florida's Audubon Society, Fish and Game Commission, the Native Plant Society, and Animal Activists of Florida, to name a few. Area schools were invited to display artwork focusing on Earth Day and our environment. The festival drew a crowd of 3000 for both days. It was a great exposure for our Chapter and gave us the opportunity to meet and talk with the locals about AAZK and our Chapter's purpose and goals. Also, we were able to sell some of our merchandise as well. In addition, we had the chance to advertise Bowling for Rhinos and distribute literature on rhinos and AAZK's involvement with the fundraiser.

The first weekend of May, Chapter member Henrick Lockhart reserved a

booth at a local mall, Altamonte Mall, to again promote Bowling for Rhinos. That same weekend, C.F.C. gathered for bowling. We set up a table at the bowling alley with information, not only on the rhino, but also on our Chapter. We provided information on how we are involved in the community, our support of area animal rehab centers, and other local projects.

The month of June we invited the Sea Turtle Preservation Society of Melbourne Beach to join our Chapter for a tour of Sea World's Turtle Rehab Facility, and to meet Sea World's animal staff. Dori Hughes, Director of S.T.P. Society gave an educational slide presentation concerning the problems facing our sea turtles, including nest robbing, destruction of habitat and high intensity street and house lights along the shoreline. We hope to see Dori and her staff this summer for the turtle projects.

July was the big month - our fundraiser for the National Association's Operating Budget. C.F.C. invited all statewide AAZK members and their guests to Sea World on 1 July. We asked for a donation of \$5.00 for AAZK members, and \$10.00 for non-members, and raised \$420.00. Those attending were treated to a free day at Sea World and a behind-the-scenes tour of the Animal Rehab Area. The Aviculture Department provided hors d'oeuvres and beverages prior to a presentation from research biologist, Dr. Dan O'Dell on "Manatee and Dugongs". Also, the Central Florida Zoological Park and Disney's Discovery Island offered free admission to AAZK members and guests from 31 June to 2 July.

Thanks to all who helped put this fundraiser together, and many thanks to all who attended. Everyone had a great time and C.F.C. is already working on next year's fundraiser. I'm positive it will be just as fun.

With all of this behind us, I departed for Medomak, ME and from there via fishing boat to Matinocos Rock (about 25 miles off-shore) to spend three weeks observing puffins and other sea birds.

C.F.C. hopes everyone has had a great summer and we are looking forward to

## **Chapter News, Continued**

seeing all of you at the National Conference in San Diego this month.

*--J. Michael Cothran, President*

### **AAZK/EFBC Chapter**

The Exotic Feline Breeding Compound, Rosamond, CA, is pleased to announce that we are a Silver sponsor (\$300.00) for the Fabulous Feline Follies. This is an annual black-tie dinner fundraiser for the Exotic Feline Breeding Compound that brings in money specifically to build a natural habitat for an endangered exotic Feline or Panthera pair. This year's theme is: Our Native American: The Cougar. Targeted is \$45,000 to build an enclosure for a cougar display and to help in breeding research.

We are currently planning several bake sales in order to raise money for a 'Wishing Well' which is a plastic vortex funnel into which many people enjoy watching their coins fall. We saw an example at the Chaffee Zoo in Fresno, CA and were impressed by the amount of money being constantly donated. If anyone has information on how to obtain one of these at below retail cost, we would certainly appreciate you dropping us a line or bringing the info to the conference in San Diego. Our address is Exotic Feline Breeding Compound, SR1, Box 84, Rosamond, CA 93560-9705. Thank you.

*--Johnny Merk, Chapter Liaison*

### **Dallas Zoo AAZK Chapter**

On 17 July our Chapter hosted a potluck luncheon for visiting members of the Oklahoma City Zoo AAZK Chapter. After filling up on food, our visitors received special tours through the zoo. Plans are in the works for our Chapter to make field trips in the near future. OKC may be our first stop!

Guest talks this month were the last in the series of Dallas Zoo papers given during the AAZPA Central Regional Conference: "Gorilla Browse Habits and Related Management" - Ralph Houy; "Dallas Zoo Bird Diversity Field

Research Aids in the Creation of New Reserve in Amazonian Peru" - Charles Siegel.

Recently we have made another stride forward with our Chapter's recycling efforts. We now have approval to place receptacles on zoo grounds to collect from zoo visitors. The first aluminum can receptacle (recycled itself from a plastic 55-gallon drum) was artfully painted with a tiger and a lion and placed in front of our cat exhibits. Many thanks go to the donor Kale and to the artist Gary Burch for their time and effort and a truly wonderful piece of art!

*--Kevin Lew, Chapter Liaison*

### **Where To Purchase Chapter Products**

**AAZK Magnetic Keeper Safety Signs** - Flint Hills AAZK Chapter, Sunset Zoo, 11th & Poyntz, Manhattan, KS 66502.

**AAZK Logo T-Shirts - Sweatshirts Colder Holders** - Little Rock Chapter AAZK, Little Rock Zoo, #1 Jonesboro Dr., Little Rock, AR 72205.

**AAZK Logo Mesh Shopping Bags** - Philadelphia AAZK Chapter, Philadelphia Zoo, 34th St. & Girard Ave., Philadelphia, PA 19104.

**AAZK Logo Keychain** - Dallas Zoo AAZK Chapter, 621 E. Clarendon, Dallas, TX 75203 attn: Sara Weller.

**AAZK Logo Bumper Sticker** - reads "Zoo Parks - Modern Arks". Please contact either Micki Corcoran or Ann Hinton at this address: Jacksonville AAZK Chapter, 8605 Zoo Road, Jacksonville, FL 32218.

**AAZK Logo Flying Saucers (Frisbees)** - Available from the Beardsley Zoo AAZK Chapter - contact Chapter Vice President Rob Thomas, c/o Beardsley Zoo, 1875 Noble Ave., Bridgeport, CT 06610.

**Zoo Stories Book** -available from Brookfield Zoo Chapter, 3300 Golf Road, Brookfield, IL 60513.

**AAZK "Keepers Care" Buttons** available from the Lincoln Park Zoo AAZK Chapter, 2200 N. Cannon Dr., Chicago, IL 60614. Attn: Susan Moy.





# Zoological Society of San Diego Non-Domestic Neonatal Symposium Titles and Abstracts

(Symposium held 4 March 1992 at San Diego Wild Animal Park)

## **\*\*\* Milk Proteins and the Neonate**

Patricia M. Olow, Children's Zoo Attendant, San Diego Zoo

Milk proteins provide a neonate mammal with essential nutrients, antibodies, enzymes, hormones, and amino acids that are needed early in life. Any damage to the structure of these proteins leaves them indigestible and renders them useless. In hand-raising neonates, there is a concern with protein denaturation by heat. In the literature reviewed, studies of the effect of heat on milk proteins all conclude similar results: When subjected to heat, milk proteins are all affected to some degree, some minor structural changes may occur, or complete protein denaturation may happen to the point where the protein may actually be harmful to the consumer. Microwave heating of milk may be the worst method of all due to its uneven heating. This leaves portions of the milk in which the proteins are completely destroyed, as well as portions which stay cool, creating a suitable environment for bacterial growth. Because the neonate is so susceptible to disease due to the underdevelopment of its immune system, it needs the full spectrum of proteins available in the milk it receives. Any loss of these essential elements through heat damage might be detrimental to its health. Some simple suggestions might help in providing the neonate with the best chance possible in obtaining high milk protein in its diet:

1. Heat milk in a warm water bath rather than "zapping" it in the microwave.
2. Sterilize bottles, nipples, and any water used to dilute formula and not the milk itself.
3. Heat milk to the lowest temperature accepted by the animal.
4. If milk is accidentally heated too hot, throw it out rather than cool it down--if fed out the milk may cause more harm than good.

## **\*\*\*San Diego Zoo's First Hand-Raised Spectacled Bear**

Michele Stancer, Senior Keeper, San Diego Zoo

On 10 February, 1992, two spectacled bear (*Tremarctos ornatus*) cubs were born to a three-year-old mother. At this age females were thought to be too young to conceive, and no denning area was prepared. One cub survived and was subsequently hand-raised in the Children's Zoo nursery. After trial and error plus gastric surgery on the cub, a dilute formula of liquid Esbilac® plus lactaid was used for a successful hand-rearing of the cub.

## **\*\*\*Salmonella and Campylobacter: What the Lab Reports Tell About Them**

Susan Euing-Quackenbush, Sr. Keeper, Infant Isolation Unit, San Diego Wild Animal Park

This paper centers around a study of laboratory report data for two bacterial pathogens found at the Wild Animal Park's two neonatal facilities. These pathogens, *Salmonella*, and *Campylobacter*, are common bacterial causes of diarrhea in neonatal hoofstock. Featured in this work are three interesting findings from the study results. These include the differences in *salmonella* serotype found at each neonatal facility, the differences in effectiveness of antibiotics among each genus, and the differences in effectiveness of some antibiotics on the same organism due to the route of administration.

An in-depth discussion of *Salmonella* and *Campylobacter* is presented with an emphasis on toxin production and taxonomy. A brief overview of the generation of a typical laboratory report from a rectal culture is also included for the benefit of the reader. In addition, possible reasons for antibiotic resistance and a commentary on public health significance of these pathogens are offered to increase the awareness of animal personnel.

The objective of this paper is to share some thought-provoking results of a study to enhance the reader's knowledge and interest in these common pathogenic pests.



## Neonatal Abstracts, Continued

### Neonatal Hoofstock Exams at the San Diego Zoo

Carrie Bressler, A.H.T., San Diego Zoo

As part of the veterinary maintenance of breeding and raising exotic ungulate species at the San Diego Zoo, neonatal hoofstock are examined during the first twenty-four hours of life. The importance of examining the neonates so soon is to check their immune status to see if they've received the antibody-rich colostrum from their mothers. Then based upon the status of their immune system, decisions can be made as to the best way the young should be raised.

### Russian Saiga Neonate Study

Karla Michelson, Lead Keeper, Infant Isolation Unit SDWAP

Esther Rubin, Senior Keeper, Infant Isolation Unit SDWAP

The population of Russian saiga (*Saiga tatarica tatarica*) in the wild has been greatly reduced and is threatened with extirpation in much of its natural habitat due to hunting and habitat encroachment. Because economic and political conditions in Russia have handicapped preservation strategies of the species, captive herds in North America have become increasingly important.

A well-planned hand-rearing program becomes even more crucial when the birth and successful rearing of each individual contributes to the survival of the species. When a lamb must be hand-reared the primary goal of the hand-rearing program is to simulate as closely as possible the natural rearing process experienced by a maternally-raised lamb. Literature on the nursing and behavioral development of the Saiga lamb was found to be scarce.

This video documents how a behavioral study was organized and carried out by keepers at the Wild Animal Park to research this stage of a young Saiga's life. Some of the topics discussed were the choosing of a suitable method of identifying the lambs in the study herd, observation and data collection techniques, and finally, the findings of the study. The video emphasized how some of these findings such as a high nursing frequency, relatively early weaning ages, and "sneak" nursing from other adult females could be employed in refining future neonatal husbandry programs.

\*\*\*denotes abstracts for which a paper is available

The next symposium will be held 24 September 1992. For those interested in obtaining papers or for information regarding future symposiums, contact Karla Michelson, Lead Keeper, Veterinary Services, Wild Animal Park, 15500 San Pasqual Valley Rd., Escondido, CA 92027-9614.



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## ATTENTION !

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We are currently seeking nominations for the 1993 Board of Directors election. There are two positions up for election. New board members will serve from 1 January 1994 through 31 December 1997. Nomination forms are due by 31 January 1993 and should be sent to: Mike Light, NEC Chairman, Wild Animal Habitat, Kings Island, Kings Island, OH 45034. For nomination forms, contact Mike or AO.



# Book Review

## Peterson Field Guides - Reptiles and Amphibians of Eastern/Central North America

By Roger Conant/Joseph T. Collins

Third Edition 1991, Houghton Mifflin Company, Boston, MA

450 pgs. Paperback \$16.95

*Review by Marilyn Cole, Keeper  
Metro Toronto Zoo  
Toronto, Ontario, Canada*

The Peterson Field Guides have long been the Bible for many naturalists, and it was with great interest that I read through this latest edition, looking for changes and/or improvements from previous guides. One of the main differences is the introduction of colored illustrations by Tom R. Johnson, in place of the old black and white in the previous editions, making it easier to verify identifications. Along with this are also updates in common names (e.g. stinkpot turtle is now called common musk turtle). The section on applying a tourniquet for snakebite has been replaced with updated information written by two medical experts and should be read by any reptile keeper or, for that matter, anyone who enjoys visiting areas where venomous reptiles occur. For some unknown reason, however, the diagrams illustrating the venom mechanism of a pit viper have been eliminated from this current edition.

The section dealing with collecting reptiles is now prefaced with a cautionary note about observing the rules and regulations of the government and emphasizes conservation by being selective. The authors go on to discourage purchases made from pet stores and recommend catching your own, with the intention of releasing them within a few weeks. This may sound laudable in theory, but in practice I expect that the majority are retained in captivity. I personally have problems resolving the meaning of conservation with field collecting of any sort.

The chapter dealing with care in captivity has many good suggestions, such as providing hide boxes for snakes, ensuring that there are no rough surfaces on which a snake can abrade its nose; the importance of appropriate temperature for the species; the importance of furniture in the cage; proper food, etc. etc. But I do not see any reference to the importance of maintaining cleanliness of the caging, except in regard to the danger of *Salmonella*; there is no reference to the need for cleanliness for the sake of the animal's health.

The maps at the back of the book have been expanded to include more species of frogs, and the bibliographic information has been updated. These are both extremely informative and useful to the amateur herpetologist. My herp friends tell me also that one can rely on the Peterson Field Guide for veracity of identification, whereas the Audubon Society Field Guide to North American Reptiles & Amphibians (Published by Alfred A. Knopf, New York) has several discrepancies and cannot be relied on -- a disturbing situation.

The price is quite moderate when one considers the wealth of information contained within the covers, and this book is a welcome addition to the library of any amateur or professional herpetologist.

*Also available in the Peterson Field Guide series are the following:*

First Guide to Seashores by John Kricher with illustrations by Gordon Morrison. Forward by Roger Tory Peterson. Paperback, \$4.95. Includes 319 color illustrations. Introduces 10 different coastal environments and more than 300 animals and plants that live there.

Eastern Butterflies by Paul A. Opler with illustrations by Vichai Malikul. Forward by Roger Tory Peterson. Paperback \$16.95/Cloth \$24.95. Includes 48 color plates, 387 maps. Describes 524 species and includes range maps, line drawings with descriptive text.

## Book Review, *Continued*

A companion book for the above might be Handbook for Butterfly Watchers by Robert Michael Pyle, illustrated by Sarah Anne Hughes. Paperback/\$11.95. Includes where to find butterflies; how to observe and photograph them; their behavior, biology, ecology and life histories; butterfly gardening; butterfly rearing; identification and conservation.

Western Bird Songs produced by Cornell Laboratory of Ornithology/Interactive Audio. Price: \$35.00/3 cassettes in a vinyl case with 16-page book or \$40.00/2 CDs, also with booklet. Includes the calls and songs of more than 500 land and water birds--a large percentage of all the species found in western North America--presented in the order in which they appear in the Field Guide.

Also available for birders are the following: Birding By Ear: Eastern: A Guide to Bird Song Identification and Birding By Ear: Western: A Guide to Bird Song Identification both

by Richard K. Walton and Robert W. Lawson (3 audio cassettes and booklet/\$35.00 each set); and Backyard Bird Song (also Walton/Lawson) one cassette and booklet/\$9.95.

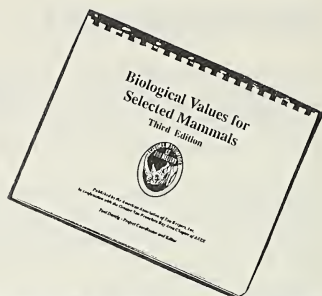
All of the above are published by Houghton Mifflin Co., 215 Park Ave. South, New York, NY 10003





Now Available

# Biological Values for Selected Mammals Third Edition - 1992



AAZK, Inc. is pleased to announce the availability of Biological Values for Selected Mammals, Third Edition. This important reference work is a project of the Greater San Francisco Bay Area Chapter of AAZK and was the result of thousands of hours of volunteer time spent in collecting data, doing computer entry, editing, proofreading, etc. Project Coordinator and Editor was Toni Danzig of San Francisco.

This Third Edition differs in a number of respects from the previous two editions. This 1992 edition is published in an 8 1/2 by 11 inch format and is comb-bound. It contains information on 457 species of mammals and covers values ranging from geographic range and habitat to Circadian cycle, size/measurements, reproductive data, life expectancy, body temperature, rearing information and status in the wild to name a few. About half of the species listings also include habitat range maps. Every attempt has been made to use only the most widely accepted scientific resources for data gathering. The volume contains a complete bibliography of references utilized.

Biological Values for Selected Mammals - Third Edition may now be ordered through the AAZK Administrative Offices. Please fill in the form below and return with your check or money order (U.S. FUNDS ONLY) to: BV III, AAZK, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK, Inc."

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*Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKE, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for this service and phone-in listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is 913-273-1980.*

**HEAD ANIMAL KEEPER**...requires two years of college in Life Sciences, and two years experience working with animals in a zoological park - one of which must have been in a supervisory capacity. Responsible for care/maintenance of varied animal collection and exhibits, and supervision for Keeper Staff. Competitive salary, plus excellent benefits. **Send Resume Only to:** John Keeley, General Curator, Grassmere Wildlife Park, P.O. Box 40266, Nashville, TN 37204.

**ASSISTANT ANIMAL SUPERVISOR**...the newly renovated Queens Zoo of North American Animals seeks an experienced animal person to help manage the daily activities at this 11-acre facility. Candidates should have a bachelor's degree in biological science and/or 3+ years experience supervising employees and caring for hoofstock and carnivores. Competitive salary. Excellent benefits package includes 3 weeks vacation, health, dental, and retirement plans. Send resume to: John Fairburn, Personnel Department, New York Zoological Society, 2300 Southern Blvd., Bronx, NY 10460. (718) 220-5119. EOE.

**BIRD KEEPER**...the Washington Zoological Park is looking for a full time bird keeper. Experience in psittacines, waterfowl and cranes (raptors optional). Degree or equivalent zoo related experience. Daily duties include bird care, habitat upkeep, breeding programs, record keeping, training, acquisitions, etc. Must be willing to work weekends/holidays. Starting salary \$12,000-\$16,000 with year-end bonus and excellent benefits. Excellent growth potential. Salary commensurate with experience. Send resume/references to: Peter A. Rittler, Administrator, Washington Zoological Park, 19525 SE 54th, Issaquah, WA 98027. Position open until filled.

**CURATOR**...curator in charge of bird and mammal departments, requires degree in biology, zoology or related animal science and minimum of 4 years animal management or supervisory experience in an accredited zoological park. Must have experience with hands-on procedures and be willing to work weekends, holidays and odd hours. Will supervise bird and mammal keepers, volunteers and docent organization. Excellent future potential for someone with strong work ethic. Starting salary \$24,000 and benefits commensurate with performance. Send cover letter, resume and three references to Peter A. Rittler, Administrator, Washington Zoological Park, 19525 SE 54th, Issaquah, WA 98027. Position open until filled.

**ZOOKEEPER /ANIMAL ENCOUNTERS**...requires one years' zookeeping experience and four-year degree (biology-related field preferred). Experience in husbandry, training and demonstrating of domestic animals preferred. Salary \$12,500, plus benefits. Send resume by **25 September 1992** to: Richard Hurst, Indianapolis Zoo, 1200 W. Washington St., Indianapolis, IN 46222.

**FRESHWATER AQUARIST**...requires bachelor's degree and three years' experience in an aquarium/zoo facility or equivalent. Primary responsibility is husbandry of worldwide collection of freshwater fishes. Salary \$21,786 with excellent benefits. Send resume and three references by **30 September 1992** to: Director, Steinhart Aquarium, California Academy of Sciences, San Francisco, CA 94118.





# AAZK Membership Application

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(requires Board approval)*

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- ☐ \$20.00 Library  
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Zoo Address \_\_\_\_\_

Title \_\_\_\_\_

Work Area \_\_\_\_\_

Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), made payable to American Association of Zoo Keepers, Inc., to : AAZK Administrative Offices, Topeka Zoo, 635 S.W. Gage Blvd., Topeka, KS 66606 U.S.A.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

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# Animal Keepers' Forum

October 1992

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*Dedicated to Professional Animal Care*



**Editor-In-Chief:** Susan Chan  
**Associate Editors:** Kayla Grams & Gretchen Ziegler

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Coordinator - Mark de Denus, Assiniboine Park Zoo, Winnipeg, Manitoba, Canada



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## Information for Contributors

*Animal Keepers' Forum* publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm ( 6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31. FAX # is 913-272-2539.

## **DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH**

Articles printed do not necessarily reflect the opinions of the *Animal Keepers' Forum* editorial staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.

Featured on this month's cover is a 21-year-old female African elephant (*Loxodonta africana*) from the Topeka Zoological Park. Endangered over nearly all of their range, the African elephant population has started to make a comeback since the ban by CITES on all ivory imports. In some parts of Africa, populations have grown to where they have outstripped the carrying capacity for the habitat and culling operations have to be undertaken. These operations often disrupt the family social unit of elephants when the older members are killed, leaving the youngsters with no elders to help them learn the elephant way of life. Thanks to Geoff Creswell, former Topeka elephant keeper, for this charming portrait of "Tembo". Thanks, Geoff!

## Scoops

and

## Scuttlebutt

### AAZK Grants Available

The American Association of Zoo Keepers, Inc. announces the availability of two \$750.00 research grants in the field of zoo biology. Interested applicants should direct their inquiries to Sue Barnard, Chairperson, AAZK Research/Grants Committee, Zoo Atlanta, Department of Herpetology, 800 Cherokee Ave. SE, Atlanta, GA 30315. The deadline for submissions is 1 March 1993.

### Nominations & Election Committee Update

We are currently seeking nominations for the 1993 Board of Directors election. There are two positions up for election. New board members will serve from 1 January 1994 through 31 December 1997. Nomination forms are due by 31 January 1993 and should be sent to: Mike Light, NEC Chairman, Wild Animal Habitat, Kings Island, Kings Island, OH 45034. Nomination forms will appear in the November 1992 issue of AAZK or you may contact Mike or AO to have forms sent to you.

### "Year of the Association" Brings More Donations to AAZK

The AAZK Board of Directors and the staff at Administrative Offices would like to thank the following Chapters and individual for their generous donations to the operating budget of the Association: Portland Chapter, Metro Washington Park Zoo, Portland, OR (\$250.00); Central Florida Chapter (includes Central Florida Zoo, Seaworld of Florida, Discovery Island and Alligatorland Safari Zoo) (\$430.00); and Bruce M. Thomas, Takoma Park, MD (\$50.00). The Central Florida Chapter held a special event, a lecture by noted research biologist Dr. Dan Odell on the endangered manatees and dugongs, to raise their donation money for the Association. Many thanks to all who have donated to AAZK.

### Zoo Careers Video Available

Metro Washington Park Zoo (Portland, OR) has produced a video curriculum on the subject of zoo careers. Zoo Careers profiles several key careers and was shot on location at the zoo. The program focuses primarily on keepers and the many tasks for which they are responsible in their day-to-day work. Viewers are taken "behind-the-scenes" to see how animals are cared for, and five keepers, the conservation research coordinator, and the general curator are interviewed. Each speaks about their work and what it means to them. Information is provided about the tasks involved and the training needed. The zoo director provides background on many other people, from graphic artist to maintenance workers to volunteers, necessary to run a zoo. The 30-minute video is divided into two equal segments. Support materials include a 26-page teacher curriculum guide with student



## **Scoops & Scuttlebutt, Continued**

activities and a set of eighteen 8 1/2 x 11 inch captioned color photos showing a variety of zoo workers and keepers on the job. Information in the video is general enough to be relevant to any accredited zoo. The entire curriculum sells for \$65.00. Discounts are available on large orders for zoos interested in resale of the package. Contact the Education Division, Metro Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221 (503) 220-2781.

## **International Zoo Yearbook Offers View on Invertebrates**

Volume 30 of the International Zoo Yearbook, a non-profit service of the Zoological Society of London, is now available and this year offers a first-ever section emphasizing terrestrial invertebrates in zoos and in the field. The 580-page volume, edited by P.J.J. Olney, contains 21 papers on invertebrates with such titles as: "Invertebrates: exhibiting the silent majority", "Captive Breeding and Conservation of Invertebrates", "Captive Breeding of Butterflies and Moths" (I - Advances in equipment and technique; II - Conserving genetic variation and managing biodiversity); and "The Control of Diseases in Insect Cultures" to name a few.

This edition also includes 13 papers in the "New Developments in the Zoo World" section. These papers cover such species as Crocodiles, Tuatara, Humboldt penguins, Salvadori's fig parrot, *Amazilia* hummingbirds, Tropicbird hornbills, Tickell's laughing thrush, Red bird of paradise, Sun-tailed guenon, Fennec fox, Giraffe, Walrus and Okapi. Also included in this volume is a list of Zoos and Aquaria of the World, two years' data on breeding in zoos, and the 1989 and 1990 census of rare animals in captivity. An additional useful section lists international studbooks along with the studbook keeper's address.

Cost of this volume is \$104 for hardbound and \$90 for softcover. While this may be a rather high price for individual keepers to afford, AAZK Chapters might want to consider purchasing a copy for their zoo's library if they do not already receive it. This way more staff members could have access to the important information contained in Volume 30 International Zoo Yearbook. Order from the editor at: The Zoological Society of London, Regent's Park, London NW1 4RY, England.



## **Notice to Members**

In the near future you will be receiving a mailing from Trans National Financial Services offering you the opportunity to apply for either a Gold or Silver AAZK Mastercard. This has been authorized by the Board of Directors and is being offered to the membership with their approval. While choosing to obtain one of these cards will offer you many benefits, it will also help provide financial support to your professional Association - AAZK, Inc. You see, AAZK will receive a royalty for each card issued, each card renewed and for each retail purchase made by a cardholder. The Board of Directors has determined that all such royalties received during the first year of the program will be designated for the AAZK Research/Grants funding program which provides financial assistance for keeper-initiated research.

# Coming Events

## International Marine Animal Trainers Association (IMATA) - 20th Annual Conference

November 1-6, 1992

Freeport, The Bahamas

For a packet containing further registration information, including travel, car rental, hotel, etc. please contact: Vic Charfauros, Vice Pres/IMATA, c/o San Diego Zoo, P.O. Box 551, San Diego, CA 92112 USA.

## Joint Meeting of the American Association of Zoo Veterinarians and the American Association of Wildlife Veterinarians

November 15-19, 1992

Oakland, CA

For more information contact: Janis Joslin, DVM (AAZV), Woodland Park Zoo, 5500 Phinney Ave. N., Seattle, WA 98103 (Phone 206-684-4873), or David Jessup, DVM (AAWV), International Wildlife Veterinary Service, Inc., P.O. Box 1413, Orangeville, CA 95622 (Phone 916-355-0124).

## **The AAZPA School for Professional Management Development for Zoo and Aquarium Personnel and Applied Zoo and Aquarium Biology**

February 7-11, 1993

Oglebay Park, W. VA

For further information contact: AAZPA, Oglebay Park, Wheeling, WVA 26003-11698.

## **Northern California Herpetological Society's Sixth Conference on the Captive Propagation and Husbandry of Reptiles and Amphibians**

February 13-15, 1993

Davis, CA

All professional and amateur herpetologists are invited to submit for consideration the titles and abstract of papers they wish to present. Send to: Conference Program Committee, Northern California Herpetological Society, P.O. Box 1363, Davis, CA 95617-1363. For more information contact: Rick Staub (707) 553-9739 or Mark Olin (707) 449-6425.

## **The AAZPA Conservation Academy March 16-20, 1993**

The AAZPA Conservation Academy will offer classes on Studbook I and SSP Coordinator Training. For further information or an application, contact Debra Boyster, AAZPA Conservation Academy, St. Louis Zoo, Forest Park, St. Louis, MO 63110 (314) 781-0900, ext. 297.

## **International Conference on Tortoise & Turtle Conservation**

July 11-17, 1993

New York, NY

Sponsored by the American Museum of Natural History's Turtle Recovery Program and the New York Turtle & Tortoise Society. For further information write to: Craig Vitamenti c/o The New York Turtle Trust & Tortoise Society, 163 Amsterdam Ave., Suite 365, New York, NY 10023 or call (212) 459-4803.

## **14th Association of Avian Veterinarians Conference**

Aug. 31 - Sept. 4, 1993

Nashville, TN

For further information and Paper Criteria, contact: AAV Conference Office, 1625 S. Birch St., Ste. 106, Denver, CO 80222 (303) 756-8380, FAX 303-759-8861.



# Births & Hatchings



**Columbus Zoological Gardens & Aquarium (Powell, OH)**...reports the following significant B&H for our institution:

**Mammals** - 0.0.2 Black and white colobus (*Colobus guereza*) [CITES II], 1.0.2 Common marmoset (*Callithrix jacchus* [CITES II] [one being hand-raised]; 0.0.1 Tree kangaroo (*Dendrolagus matschiei*) [zoo's lst]; 0.0.1 Dwarf zebu (*Bos primigenus*) [U]; 0.1 Topi antelope (*Damaliscus lunatus*) [T]; and 2.0 Bongo antelope (*Tragelaphus eurycerus*) [T].

**Birds** - 0.1 Bald eagle (*Haliaeetus leucacephalus*) [E], and 0.0.2 Black-footed penguin (*Spheniscus demersus*).

**Reptiles** - 0.0.12 Beaded dragon (*Pogona vitticeps*) [3rd generation]; 0.0.1 Voodoo turtle (*Trachemys decorata*) [lst in any zoo, as far as we know]; 0.0.25 Plumed basiliscus lizard (*Basiliscus plumifrons*) [zoo's lst]; and 0.0.1 Barbour map turtle (*Graptemys barbouri*) [zoo's lst]. submitted by Carrie Babbitt, Chapter Liaison, Columbus Zoo AAZK Chapter, Powell, OH.

**Memphis Zoo & Aquarium (Memphis, TN)**...announces the following significant B&H for Jan.-Aug. 1992:

**Mammals** - 1.1 Lowland anoa (*Bubalis depressicornis*) [E]; 1.2 Bontebok (*Damaliscus dorcas dorcas*) [E]; 1.2 Blesbok (*Damaliscus dorcas philipsi*) [exhibit change]; 1.0 Nilgiri tahr (*Hemitragus hylocrius*) [R]; 0.1 Black-backed duiker (*Cephalophus monticola*) [lst for zoo]; 0.0.1 Dusky titi (*Callicebus moloch*) [R]; 1.0 Ring-tailed lemur (*Lemur catta*) [E]; 1.1 Pere David's deer (*Elaphurus davidensis*) [E]; 0.2 Hog deer (*Axis porcinus*) [E]; 1.0 Malayan tapir (*Tapirus indictus*) [R]; 2.2 Sable antelope (*Hippotragus niger*) [R].

**Birds** - 0.0.1 Silver-eared mesia (*Leiothrix argentea*) [zoo's lst]; 0.0.2 Hooded pitta (*Pitta sordida*) [zoo's lst]; 0.0.1 San Blas Jay (*Cissilopha sanblasiana*) [zoo's lst]; 0.0.1 Wompoo/Magnificent fruit dove (*Ptilinopus magnificus*) [zoo's lst]; 0.0.1 Fairy bluebird (*Irena puella*) [R], [zoo's lst].

**Herpetarium and Aquarium** - 0.0.4 Panther chameleons (*Chamaeleo pardalis*) [zoo's lst]; 0.0.150 Desert pupfish (*Cyprinodon macularius*) [E]. submitted by Cindy Pinger, Chapter Liaison, Memphis Zoo AAZK Chapter, Memphis, TN.

**Milwaukee County Zoo (Milwaukee, WI)**...reports the following significant B&H from 1 April through 30 June 1992:

**Mammals** - 0.1 Greater kudu (*Tragelaphus strepsiceros strepsice*) [U]; 1.0.1 Vampire bat (*Desmodus rotundus*) [history of 57 births]; 0.0.1 Straw-colored fruit bat (*Eidolon helvum*) [mother-reared]; 4.7.4 Ruwenzori long-haired fruit bat (*Rousettus lanosus*) [U].

**Birds** - 0.1 Humboldt penguin (*Spheniscus humboldti*) [E/SSP]; 0.0.2 Bali-Rothschild's mynah (*Leucopsar rothschildi*) [E/SSP]; 0.0.34 Trumpeter swan (*Cygnus cygnus buccinator*) [E in Wisconsin]. submitted by Wayne Hazlett, Chapter Liaison, Milwaukee County Zoo AAZK Chapter, Milwaukee, WI.



## **Births & Hatchings, Continued**

**Kansas City Zoo (Kansas City, MO)**...announces the following significant B&H from Jan.-Aug. 1992:

**Mammals** - 1.1 Dromedary camel (*Camelus dromedarius*) [1.0 hand-raised]; 1.0 Chapman's zebra (*Equus burchelli antiquorum*) [hand-raised].

**Birds** - 0.0.2 Bali mynah (*Leucopsar rothschildi*) [E/SSP]; 0.0.2 Victoria crowned pigeon (*Goura victoria*) [E/SSP]; 0.0.11 Roseate spoonbill (*Ajaia ajaja*) [0.1 hand-raised].  
submitted by Shirley Williams, Kansas City Zoo, Kansas City, MO.



**Male Chapman's zebra (*Equus burchelli antiquorum*) born on 29 July, 1992 at the Kansas City Zoo. The colt, which stands 34 inches at the shoulder and weighs 95 lbs., was hand-raised following its mother's death. (Photo by Fran Baker)**

**Lubee Foundation (Gainesville, FL)**...reports the following primate births for 1992. On 11 January 1992, the Lubee Foundation, Inc. imported the Kilverstone marmoset tamarin and Spider monkey collection. The following are the first recorded births at this facility: 2.0 Black-eared marmoset (*Callithrix penicillata penicillata*) [T]; 2.0 Black tufted ear marmoset (*Callithrix penicillata kuhli*) [T]; 0.0.2 Tassel-ear marmoset (*Callithrix humeralifer humeralifer*) [T] [we are the only facility to house this species outside South America]; 0.0.2 Silvery marmoset (*Callithrix argentata argentata*) [T]; 0.0.3 Pygmy marmoset (*Cebuella pygmaea*) [U]; 2.0 Weddells tamarin (*Saguinus fuscicollis weddelli*) [T]; 2.0 Red mantle tamarin (*Saguinus fuscicollis illigeri*); 1.0 Red-handed tamarin (*Saguinus midas midas*) [U]. submitted by Bryan Sepp, primate keeper, Lubee Foundation, Gainesville, FL.



## ***From the President.....***

Composing the message from the President to the membership of AAZK is sometimes a very difficult task. In order to meet the printing deadline for AKF, these messages are, at times, written almost six weeks in advance. Hurricane Andrew and the subsequent damage and devastation were still three weeks away when the September message was written. I would like to take this opportunity to bring every member up to speed on what your Association is doing to help the massive relief effort.

I have tried to keep the Chapters abreast of the important details that have been relayed to us by AAZPA and the institutions involved in the relief efforts. The AAZK Administrative Offices have served well in the capacity of an information clearinghouse, giving our concerned membership details of the destruction and directing requests for help.

AAZK Chapters across the country have responded with an unprecedented relief effort to help our fellow zoo professionals in the south Florida area. Many Chapters are to be praised for their involvement in this effort.

The L.I.N.K. System, the Florida Regional Coordinator, the Florida AAZK Chapters and the staffs at all the Florida institutions have worked tremendously hard to coordinate the relief supplies on the local level. Many thanks go out to all those involved.

On 28 August, Frank Kohn, Past President/AAZK appeared with AAZPA staff as a representative of AAZK at a national press conference in Washington, DC concerning the hurricane damage. Frank offered a keeper's perspective on the physical and emotional stress that both animal and staff will undergo during the next few months. As you probably know, the establishment of the AAZPA Zoo Crisis Fund was announced at that time. I would like to encourage all Chapters and members to utilize this fund to support the relief services desperately needed by south Florida zoos and aquariums. Donations may be sent to:

**Zoo Crisis Fund  
7970-D Old Georgetown Road  
Bethesda, MD 20814-2439  
(301) 907-7777**

## **South Florida Hurricane Damage Update**

It is difficult at best to try and describe the devastation and destruction wrecked on south Florida by Hurricane Andrew. The damage to zoological facilities has been tremendous, not only in terms of loss of animals and facilities, but also in the personal losses sustained by many zoo staff members. With the suffering and hardship being experienced by so many people in the south Florida area, assisting in the reconstruction and relief efforts at zoos may seem a pretty low priority to some. But for those of us involved in the field, the closeness and natural affinity of the zoo community draws us together in a united front at this time of great need.

The South Florida AAZK Chapters responded by coordinating an immediate relief effort for their fellow keepers. Dreher Park Zoo served as a drop point for Chapter shipments and the staff inventoried materials and dispensed clothing and materials to those in need.

The AAZPA reports that during the first week of its existence, the Zoo Crisis Fund had received \$33,000 in donations. AAZK has been working closely with AAZPA to pass on information about conditions at the various facilities, as well as their immediate and long-term needs to our Chapters. However, for those members not involved at the Chapter level, here is a brief outline of what we know to be the situation at south Florida zoos and aquariums (the information below constitutes what we were aware of as of our deadline on 17 September):



## **From the President,** *Continued*

**Miami MetroZoo** has suffered an estimated \$20-50 million dollars in damage. All large structures are intact and all animals have been secured. Most small structure, aviary and wire-type holding areas have been destroyed or sustained damage. Administrative offices, food preparation areas, food storage areas, etc. have sustained significant damage or have been destroyed. Animal collection losses included three antelope, a ostrich hit by flying debris, a small gibbon and many birds killed when the 60-ft high netting roof of the Wings of Asia Aviary collapsed. Birds which were recaptured have been sent by truck to other facilities. Workers found a newborn, but motherless Yellow-backed duiker in a dry moat and named it "Andrew". All cats and apes are fine and will not be relocated at this time. The Zoo is working with the Elephant SSP Coordinator to relocate the pachyderms. A number of staff members have lost their homes. Busch Gardens has been a central staging area for relief efforts to this facility.

**Parrot Jungle** reports that while the entire animal collection survived the storm, the facility's vegetation, including the largest stand of old cypress in south Florida, was virtually destroyed. Nearly one-fourth of the perimeter fencing was damaged, and greenhouses, walkways and a flight cage were destroyed.

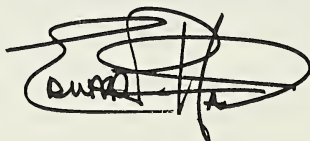
**Monkey Jungle** reports all perimeter fences were down and many of the surviving animals were roaming the grounds. Materials needed to reestablish perimeter fencing have been provided by Zoo Atlanta, the Columbus Zoo and Owens Construction Co. of Columbus, OH. Zoo Atlanta has taken a major role in helping coordinate relief efforts sending vehicles, staff and food.

**Miami Sequarium** reports they have suffered heavy damage to equipment, pumps, walkways and landscaping. Five sea lions died due to lightning strikes, and some of the sharks living in sea front units were killed by silt washing into their enclosures. On the bright side, they had a manatee born during the storm and it was named "Stormy". Their parrot and flamingo collections are fine.

**Ocean World** reports the loss of one dolphin.

**Dolphin Research Center** reports one of their dolphins escaped (the facility is an open-ocean area), but they report everything else is OK.

A number of AAZK Chapters have been assisting in relief efforts. Any Chapters of individuals interesting in helping out are asked to (1) send monetary donations to Zoo Crisis Fund, 7970-D Old Georgetown Rd., Bethesda, MD20814-2980; or 2) all other offers of assistance should be coordinated through AAZK President Ed Hansen at Reid Park Zoo (602) 791-3204. AAZK is cooperating with AAZPA to assure there are not unnecessary duplication of efforts and that relief may be sent in the most efficient manner. Thank you for your cooperation.



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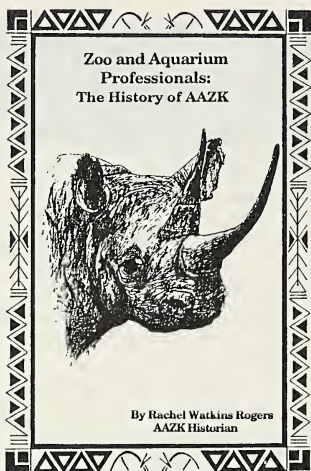
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## Zoo and Aquarium Professionals: the History of AAZK

AAZK is pleased to announce the availability of Zoo and Aquarium Professionals: the History of AAZK. This 216-page volume chronicles the history of the American Association of Zoo Keepers from its beginnings at the San Diego Zoo in 1967. Included in the book is the early evolution of the Association, its projects, programs and committees, the histories of its 70

plus chapters, and its highly successful conservation programs - "Bowling for Rhinos" and the Ecosystem Survival Plan's Conservation Parking Meters.

AAZK is proud of the progress it has made in the past 25 years in the promotion of professionalism among zoo keepers and is pleased to share this growth through the pages of Zoo and Aquarium Professionals: the History of AAZK.

The book may be ordered by completing the form below and returning it to: AAZK History Book, AAZK Administrative Offices, 635 S.W. Gage Blvd., Topeka, KS 66606. Make checks or money orders payable to "AAZK, Inc."

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# Giving Woolly Monkeys a Helping Hand

By  
*Silvia Logsdon, Keeper III*  
*Louisville Zoological Garden*  
*Louisville, KY*

The Louisville Zoo has been successful in the management and propagation of the Woolly monkey (*Lagothrix lagotricha*) for 13 years. The present troop consists of 1.4 breeding adults and 7.2 juveniles.

Kizzy, an eleven-year-old female, has successfully raised four offspring. There were no complications with the births of two female offspring born in 1987 and 1990. However, two male offspring--Jay (b. 17/2/89) and Jethro (b. 13/6/92)--were considered to have high birthweights of 490 and 530 grams respectively. Both male infants were found on the floor of the indoor exhibit immediately after birth, possibly due to difficult deliveries. With the combined efforts of keepers and veterinary staff, the infants were returned to Kizzy and raised by her.

The male infants were initially removed, placed in an incubator, given glucose and checked for gripping ability. Then, Kizzy was lightly anesthetized, netted and restrained. In each case, the infant was placed on Kizzy's abdomen. Mother and infant were placed in a sky kennel and kept in a quiet place overnight to allow for maternal bonding to take place. They were monitored every hour throughout the night to ensure that the baby was still on the mother.

The next day, after observations confirmed the infant was nursing and Kizzy was alert, they were let out of the kennel into a smaller stall. Soon afterwards, they were back with the troop and doing well.

It is important not only to get mother and baby reunited quickly but also reintroduced to the troop so they could all resume normal activities. The sight of an infant growing up in a socially well-established troop was well worth the long- late-night hours spent giving a helping hand.



Woolly monkeys at the Louisville Zoo. From, left to right, 1987 offspring Millie; juvenile offspring Jay with infant Jethro; Kizzy; other troop members. (Photo by Silvia Logsdon)



# Viewpoint

**Response by Eric Sampson,  
Alexandria, VA to:  
"You Learn What You Eat"  
(published in *AKF* August 1992 by  
C. Tromborg and G. Mitchell)**

Authors C. Tromborg and G. Mitchell wrote in the August issue of *Animal Keepers' Forum* that zoos need to revamp food concessions to reflect educational goals worthy of such institutions ("You Learn What You Eat", pp. 277-278). While it is true that the culinary offerings of many zoological parks leave something to be desired (we were never promised a four-star restaurant), asking a zoo to squeeze a meaningful message into its food is probably asking a bit too much. Put informative trivia on the (recyclable) soda cups and conservation tips on the napkins, but please, leave my hot dog out of this.

Modern zoos compete with movies, computer games, television, and myriad other distractions for an ever-shortening public attention span. To think that a zoo is above the realm of entertainment is to miss the point: A good zoo blends the recreational with the educational, using amusement as the vehicle for a very serious message. It is nearly impossible to overstate the important role zoos can play in teaching us about the world we share. On the other hand, it is entirely possible to overestimate the gains that *might* be made by replacing commonly accepted zoo fare with more "educational" concessions.

The authors of the article suggest that one way to make zoo food more informative would be to offer the public what the animals themselves eat in the wild. I imagine the following conversation:

KIDS: "We're hungry! We're hungry!"

PARENT: "O.K. Let's go over to the great ape house for a heaping bowl of figs!"

KIDS: "Gee, Dad. Been inhaling tile grout again?"

I shudder to think what might be offered outside the reptile house.

At the risk of pushing the entertainment/education parallel too far, asking zoo patrons to eat the same things as animals is a little like asking moviegoers to duplicate the eating habits of actors. Learning to balance a shrimp cocktail on your knees while opening a box of Gummi-Bears™ might take some practice, but it could be done.

A *display* of what an animal eats in the wild and at the zoo can be both captivating and educational. Show a youngster a deceased rat, tell him or her that it will go to feed the hawk later on, and you're going to get some attention. Granted, that's an extreme example, but any type of interactive hands-on get-dirty make-the-parents-say -"yech" exhibit will be more effective than a bunch of figs.

The authors go on to point out that, "Chipped ice covered with sugar water which has been dyed red - 'snow cones' - will not do". Uh, why not? After a long, hot day spent tramping around a zoo, I'd kind of like a snow cone. They're refreshing and a little sugar helps me get a second wind (O.K., so they're fun too).

One should be able to get a decent, healthy meal at any zoo, and I have yet to set foot in a park where that isn't true. Of all the reasons people visit zoos --- to look at animals, walk, chat, or for a family outing-- food is not typically a priority. Patrons want the familiar, the dependable (especially when children are in tow). Forced to confront a radical dietary change, people might respond by not coming through the gates. Show people conservation, don't bludgeon them with it.

## Viewpoint, continued

So relax. The sight of a sea lion being fed will stay with a child long after the last dribbles of snow cone have run down her arm. The gleeful sound of gibbons announcing themselves will reverberate in the ears well beyond the expected shelf life of the Milk Duds™ under the car seat. Food plays a part in the zoo experience, but it is more of a walk-on role without lines, a small part of the backdrop. Zoos are places for fun as well as learning---places for pointing and gawking and yelling and horrendous anthropomorphizing. So rare is their ability to educate while enthralling, zoos are faced with a daunting task and scarce resources. Zoos should strive to give patrons more interaction with exhibits, improve signs, and provide more details about individual animals and the geographical regions they inhabit. In short, zoos should put more energy into the things they do better than any other institution. We will always hunger for knowledge.

Now please, pass the mustard.

*The Viewpoint Column is made available for the discussion of opinions pertinent to all aspects of zoos and zookeeping. Publication of reader's opinions does not imply endorsement on the part of AKF or AAZK, nor do opinions expressed herein necessarily reflect those of AKF or AAZK. The AAZK Board of Directors and the AKF editorial staff reserve the right to determine the appropriateness of articles submitted for this column.*



## **New Research Opportunities at the Topeka Zoological Park**

The Topeka Zoological Park has established a Scientific Studies Program and invites scientifically competent studies that contribute to: 1) conserving and/or preserving threatened or endangered plants and animals; 2) maintaining or improving husbandry of plants and animals in a zoological park; 3) understanding the biology, behavior, medical care or other scientific disciplines dealing with plants and animals; and 4) understanding the functional dynamics of a modern zoological park.

Proposals will be reviewed by the Zoo's Scientific Studies Committee. For more information or to submit proposals, contact Dr. Hugh Quinn, Director, Topeka Zoological Park, 635 S.W. Gage Blvd., Topeka, KS 66606-2066 or phone (913) 272-5821.

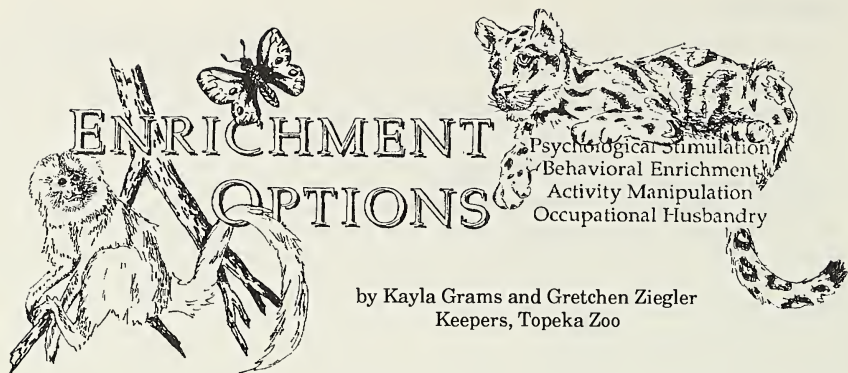
## **Digit Fund Update**

Guards in Rwanda's Parc National des Volcans located eight of the 11 members of Mrithi's family group on 4 August. These endangered Mountain gorillas, missing since 18 June, were spotted on the Rwandan side of the Rwanda/Zaire border.

Mrithi, the 24-year-old silverback leader of Group 13, an habituated tourist group, was shot to death on 21 May, an apparent casualty of the rebel uprisings in Rwanda which began October 1990. Bullets found in Mrithi's body were a type used by combatants on both sides of the conflict.

The Group's cohesion was disrupted by Mrithi's death and, for a short time, a 12-year-old male named Ukawacumi appeared to take over the leadership of Group 13. However, he disappeared without a trace and is still missing along with Gukunda, a 19-year-old female, and Terimbera, a 4-year-old female. The Group's second silverback, Munane appears to be leading the family, however, guards report larger gorillas are fighting for possession of the females. In turmoil, the gorilla family is crisscrossing the border between Rwanda and Zaire. The search mission was organized by the Rwandan Park officials in cooperation with the government of Zaire. --*The Digit Fund News Release 8-12-92*





We would like to call your attention to a new newsletter whose premier issue debuted in September. It is called "*The Shape of Enrichment*", and will be published quarterly. It contains ideas and articles covering all aspects of enrichment. Editors are Valerie J. Hare and Karen E. Worley, and ideas/articles may be sent to: *The Shape of Enrichment*, 1650 Minden Dr., San Diego, CA 92111-7124. We encourage you to continue to submit material to AKF as we will be sharing information with this new publication.

**HIPPOS** - the Sacramento Zoo exhibits a 28-year-old female Nile hippo. Her companion died over 10 years ago. To provide social stimulation, keepers make an effort to interact with her everyday. During summer months we have a daily educational hippo-talk which includes throwing produce onto an island along her pool's edge. This encourages her to leave the water for better public viewing. This year we may continue these afternoon feedings beyond the high visitor season as a recreational diversion for her.

A few years ago, we introduced a large Boomer Ball™ as a toy item. This is provided only a few days a week to avoid boredom with the ball. She pushes it around the pool, attempts to sink it, bite it, or push it out of the water. Since introducing the Boomer Ball™, her activity level has increased dramatically. The public enjoys watching her antics and spends much more time at her exhibit.

For years we've had a daily routine of inspecting her teeth and mouth. She swims to the water's edge and opens her mouth for food treats or to solicit massaging of her teeth and gums. Recently we began scrubbing her mouth and teeth with a soft brush. By attaching a long handle we can now also scrub her back and make more thorough skin inspections.

We anticipate these daily grooming sessions will provide greater social and physical stimulation for her while creating a better opportunity for her keepers to provide quality health care.

--Lee Houts, Ungulate Keeper  
Sacramento Zoo, Sacramento, CA

**BIRDS** - hang bunches of grapes in exhibit instead of putting them in the diets, especially for Toucans and Hornbills. This allows the public to see how the birds use their bills. An easy way to do this is to attach a twist tie to a branch and twist the bunch on and off.

Cricket feeders (natural) - seal one end of a hollow log (I use fiberglass) and place a hinged door on the other end. Drill several holes (about 5/16") near the bottom of the log. If the crickets are chilled for a time (about 1 hour) they are easier to put into the log and will revive at varied rates.

--Teri Maas, Bird Keeper  
Philadelphia Zoo, Philadelphia, PA





**L.I.N.K.**  
**(Liaison and Information Network for Keepers)**

Coordinator for the LINK System: Mark de Denus, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba, Canada R3P 0R5. (204) 837-2916 (h).

**Regional Coordinators**

**ALABAMA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**ALASKA** - Vacancy  
**ARIZONA** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**ARKANSAS** - Debbie Jackson or Ann Rademacher, Little Rock Zoological Gardens, #1 Jonesboro Dr., Little Rock, AR 72205  
**CALIFORNIA** - Vacancy  
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**CONNECTICUT** - Jeanette Nadeau, Roger Williams Park Zoo, Providence, RI 02905  
**DELEWARE** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**FLORIDA** - Rick Smith, 5752 Stoneridge, Orlando, FL 32839  
**GEORGIA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**HAWAII** - Michelle Suenishi, Hilton Hawaiian Village, 2950 Ena Rd., Honolulu, HI 96815  
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**IOWA** - Carla Wieser, Omaha's Henry Doorly Zoo, 10th St. & Deer Park Blvd., Omaha, NE 68107  
**KANSAS** - Gretchen Ziegler, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606  
**KENTUCKY** - Thomas Benner, Toledo Zoo, 2700 Broadway, Toledo, OH 43609  
**LOUISIANA** - Michelle Asselin, Audubon Park & Zoological Gardens, P.O. Box 4327, New Orleans, LA 70115  
**MAINE** - Jeanette Nadeau (see addresses under CT)  
**MARYLAND** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA  
**MASSACHUSETTS** - Jeanette Nadeau (see addresses under CT)  
**MICHIGAN** - Dan Powell, Potawatomi Zoo, 500 S. Greenlawn, South Bend, IN 46615  
**MINNESOTA** - Tim Hill, Minnesota Zoological Gardens, 13000 Zoo Blvd., Apple Valley, MN 55124  
**MISSISSIPPI** - Jeannie Frazier, Jackson Zoological Park, 2918 W. Capitol, Jackson, MS 39209  
**MISSOURI** - Vacancy  
**MONTANA** - Vacancy  
**NEBRASKA** - Carla Wieser (see address under Iowa)  
**NEVADA** - Patricia Simonet, Wildlife Safaris, P.O. Box 6735, Incline Village, NV 89450  
**NEW HAMPSHIRE** - Jeanette Nadeau (see addresses under CT)  
**NEW JERSEY** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**NEW MEXICO** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**EAST NEW YORK** - Frank Leonard, Bronx Zoo, 185th & Southern Blvd., Bronx, NY 10460  
**WEST NEW YORK** - Alan Baker, Burnet Park Zoo, 500 Burnet Park Dr., Syracuse, NY 13204  
**NORTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**NORTH DAKOTA** - Bob Debets, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba Canada R3P 0R5 (204) 986-4040 [w]  
**OHIO** - Vacancy  
**OKLAHOMA** - Debbie Jackson or Ann Rademacher (see addresses under AR)  
**OREGON** - Anna Michel, Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221  
**PENNSYLVANIA** - Theresa Maas, Philadelphia Zoo, 3400 W. Girard, Philadelphia, PA 19104  
**RHODE ISLAND** - Jeanette Nadeau (see addresses under CT)  
**SOUTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**SOUTH DAKOTA** - Bob Debets (see address under ND)  
**TENNESSEE** - Gail Karr or Cindy Pinger, Memphis Zoo & Aquarium, 2000 Galloway, Memphis, TN 38112  
**TEXAS** - Ann Marie Greco, San Antonio Zoo, 3903 N. St. Mary's St., San Antonio, TX 78212  
**UTAH** - Suzanne Chacon-Brennan, Denver Zoo, City Park, Denver, CO 80205  
**VERMONT** - Jeanette Nadeau (see addresses under CT)  
**VIRGINIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**WASHINGTON** - Elandra Aum, Woodland Park Zoo, 5500 Phinney Ave. N, Seattle, WA 98103  
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**Provinces of Manitoba & Saskatchewan** - Bob Debets (see address under ND)  
**Province of Quebec** - Vacancy  
**Provinces of Alberta & British Columbia** - Grant Tkachuk, 10139 157th St., #206, Edmonton, Alberta T5P 2T9



# Book Review

## **The Wolf: The Ecology and Behavior of an Endangered Species**

By L. David Mech , University of Minnesota Press,  
2037 University Avenue So. E., Minneapolis, MN 55414  
384 pgs. Paperback

*Review By Tammy Schmidt  
Animal Keeper  
Grassmere Wildlife Park  
Nashville, TN*

"Who's afraid of the big bad wolf?" This is a question that many people have grown up hearing, even though it has been documented that there have been no indications of wolves harming any human beings (Cowan, 1970).

L. David Mech is a wildlife biologist with the United States Department of the Interior. He relates his experiences with wolves clearly, in understandable terms. Anecdotes and personal achievements are throughout the book.

Mech's objectives include offering an 'up-to-date' reference book on the wolf which in his opinion is warranted. The book starts with the original preface and a revised, updated preface. The 1980 preface, for the most part, proves to back up Mech's original findings. The main changes include new information on the basic natural history of the wolf; the Isle Royale wolf/moose system; and the current (1980) biological status of the wolf.

The author speculates at times when information is lacking on certain topics. He points out that disagreements occurring, due to his speculations, may prompt further study into the future of the wolf.

Chapter I is especially compelling for me personally due to my own involvement with a small pack of grey wolves (*Canis lupus*). It answered so many of my unanswered questions about personality, wildness, and fear as well as the intelligence of the wolf. This chapter is thirty-seven pages long and is an excellent manual for novice wolf keepers.

The remaining chapters include the following topics: Wolf Society - Packs and Populations; Social Order; Expression and Communication; Reproduction and Family Life; Wolf Wanderings; Food Habits; Hunting Habits; Selection of Prey; Effects of Wolf Predation; Relations With Non-prey Species; Factors Harmful to the Wolf; and, the Future of the Wolf. The twelve chapters in this book are packed with a wealth of information, each with clear and concise data.

Chapter XII includes the future outlook of the wolf. Mech discusses goals he feels would aid in research aimed at saving species. They include making accurate inventories of the wolves' presence in Michigan and Minnesota, with the extent of their range movement. Also, assessments need to be made of the effects of the wolf on domestic and game animals in the aforementioned states. Results compiled from the preceding objectives would result in proper methods of managing and maintaining the wolf populations. Basically, Mech concludes that if many misconceptions held by the anti-wolf movement were dispelled, then the future of the wolf would move towards a more positive outlook in North America.

The appendices are comprised of three parts. The first is a discussion of subspecies in North America and eight subspecies in Eurasia. Mech explains the references used to substantiate each subspecies which are supported by the latest and most comprehensive references available. The second involved the manner of calculating the survival rates. It is very detailed and extensive. The last appendix lists the scientific names of organisms referred to in the text. This would be a valuable aid to someone doing a research project.

This book is an interesting and enthusiastic guide for those who want to learn more about wolves for the enjoyment of learning, and those who work with them on a daily basis. The Wolf: The Ecology and Behavior of an Endangered Species is a good investment for a thorough education on canids and simply a nice book to add to anyone's library.



# **Zoo Infant Development Project Bird Section**

**You have heard about the ZIDP for mammals.**

**Now let's hear from some bird keepers!**

**We began collecting information at the Toledo Conference and we still want any rearing protocols you can send us. But we are breaking the project into smaller sections.**

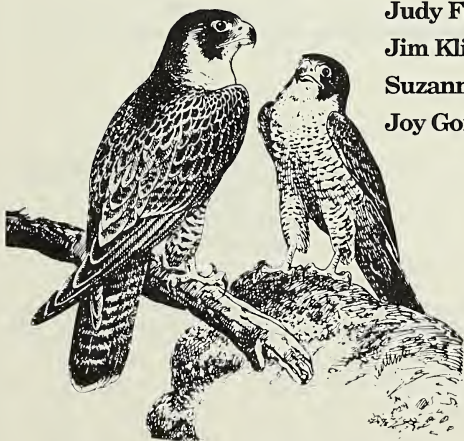
**First we plan to publish a section on Ciconiiformes sometime in the spring. We are focusing on Coraciiformes, Sternidae and Raptors. What worked and didn't work for you? Complete the form included here with the information you have and send it to us. Feel free to photocopy the forms for additional submissions. If you need a form call us.**

**Maggie Liguori or Teri Maas   Philadelphia Zoo  
(215) 243 - 1100 ext. 313**

**Kim Livingstone   San Diego Zoo  
(619) 557 - 3977**

**Many thanks to those who have already submitted completed forms for us:**

**P. Carney and Nancy Stengel, Buffalo Zoo  
Judy Fabian, San Antonio Zoo  
Jim Klinesteker, John Ball Zoological Park  
Suzanne Chacon, Denver Zoo  
Joy Gonzalez, Bronx Zoo**



**Let's hear from everyone else !!**



## AAZK Infant Development Data Sheet Instructions

The Bird Development Project will provide information on the physical and behavioral development of a variety of parent and hand-reared zoo specimens. By collecting data from a large number of institutions, the information will provide a basis for comparison for different species as well as serve as a guide for chicks requiring hand-rearing. We may also begin to notice trends that lead to more successful rearing.

### PLEASE FOLLOW THESE GUIDELINES:

1. The format was developed for easy retrieval of information. Please do not let it restrict your contribution. Place additional information on the back of the pages and it will be included in the published results.
2. Be as THOROUGH AS POSSIBLE. Lack of information in some of the requested categories does not make your report invalid. Please submit all you can, but DO SUBMIT IT.
3. Use one form per rearing experience.
4. DATES: Use international date format with month abbreviated. Please follow dates with age in days. EXAMPLE: Date of Hatch: 6 Sept 91 = Day 0
5. WEIGHTS: Use metric. If you have converted from pounds, you may place your original figure in parentheses following metric weight. EXAMPLE: 5.45 Kg (12 lbs)
6. AGES: Where age is requested please use number of days.
7. TIMES: Use 24 hour clock. 1:00 p.m. is 1300 hrs etc.
8. SIGNIFICANT DEVELOPMENTS: This will vary with the species. We felt the keeper would be the best judge as to which developments are significant to the species.
9. FINAL RESULT: If the animal dies, please note age, date and final cause of death. How long did it stay in the exhibit? Did it eventually breed and at what age? Etc.
10. Please complete as many of the three sheets as possible. You may or may not need page 2. If you have a special case (for example- parent-reared chick pulled at fledging) please complete all three sheets.

NOTICE: All information submitted is intended for publication. Please follow your institution's guidelines and get necessary approval before sending information.

### SEND COMPLETED FORMS TO:

(Nonpasserines)  
Teri Maas/Maggie Liguori  
c/o Philadelphia Zoo  
3400 W. Girard Ave.  
Philadelphia, PA 19104  
(215) 243-1100 ext 313

(Passerines)  
Kim Livingstone  
c/o San Diego Zoo, Bird Dept.  
P.O. Box 551  
San Diego, CA 92112  
(619) 557-3977

Feel free to duplicate and freely distribute these instructions and forms or, if you like, you may request forms directly from us.

[illegible]

# Z.I.D.P. BIRD DEVELOPMENT DATA SHEET

Common Name:

Scientific Name:

Institution:

## CHICK INFORMATION

---

a. Precocial/Altricial?

b. Parental feeding patterns:

c. Parental brooding:

d. Significant developments or changes in chick behavior during rearing:





# Z.I.D.P. BIRD DEVELOPMENT DATA SHEET

Common Name:

Scientific Name:

Institution:

## ARTIFICIAL INCUBATION/HAND REARING

---

a. Reason for pulling egg/chick:

b. Age/weight when removed from nest:

c. Incubator information:  
Incubator type/brand:

Temperature:  
Dry bulb

Wet bulb

d. Length of incubation:(# Days in incubator, when moved to hatcher, Data on weight changes during incubation ....)

e. Hatcher information: (Hatch weight, helped at hatch.....)

f. Brooder conditions: (temperatures, bulbs, H<sub>2</sub>O dishes, perching, mats, pool depths, brooder mates.....)



# Z.I.D.P. BIRD DEVELOPMENT DATA SHEET

Common name:

Scientific Name:

Family:

Order:

Submitted By:

Position:

Institution:

Address:

Phone: (     )

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## REPRODUCTIVE HISTORY

### PARENT INFORMATION:

- a. Age at first successful hatch:
- b. Frequency of nesting/nesting interval:
- c. Other:

**BREEDING & COURTSHIP BEHAVIORS:** (Intra or interspecies aggression, special breeding diet, time of year, territoriality.....)

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## NEST ENVIRONMENT

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**EXHIBIT INFORMATION:** (Substrate, cover, cagemates, temperature.....)



DESCRIPTION OF NEST: (Location, materials, measurements, type,.....)

INCUBATION:

a. Egg information: (Description, number, laying interval, length of incubation, is incubation shared...)

b. Clutch information: (Number of clutches, percent hatched, synchronous/asynchronous hatching, time before re-laying.....)

c. Other: (Length of pipping, hatching sequence, disposal of shell.....)

d. Parents Brooding? ☐ M ☐ F ☐ Both  
Parents Feeding? ☐ M ☐ F ☐ Both

Problems Encountered?



g. Feeding notes/techniques: Tools used.... (please also complete diet sheet)

h. Special cases: (Naturally incubated then pulled, eggs returned to nest as pipping, chicks hand-fed in enclosure, ....) Please explain reasons, timing, procedures.

i. Problems encountered:

e. Final disposition: (cause of death if applicable)





# Behavior of Captive Tufted and Common Puffins During Breeding and Incubation

By

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\*Order of authorship determined by coin toss. Both authors contributed equally to manuscript. Manuscript was originally submitted in March 1992.

## Introduction

Maintaining a beneficial environment for animals presents unique problems for the animal keeper. These problems arise from the inability to simulate an animal's entire natural habitat and difficulty in determining what elements of that habitat are essential to the animal's well-being. Lack of appropriate stimuli in the exhibit may cause abnormal behavior, health problems, and disruption of reproduction.

Low reproductive success in captivity can be a sign that an animal's physical and behavioral needs are not being met (Hediger, 1964). Historically, puffin reproduction in zoos has been poor. This may be due to environmental factors such as inappropriate light/dark cycles, reduced activity from easily accessible food and restricted flying area, inadequate nesting materials, as well as group size and density; all of which influence an animal's physiological state.

Much is known about puffin behavior in the wild, but we know of no studies of captive puffin populations; therefore, we documented maintenance, social, breeding and incubation behavior in a zoo environment. By comparing behaviors of this captive population with those reported for wild puffin colonies, we may discover which environmental factors are responsible for reduced reproductive success.

## Methods

Observations were made on seven Tufted puffins (*Lunda cirrhata*) and two Common puffins (*Fratercula arctica*) at the Indianapolis Zoo (Table 1).

**Table 1 - Description of birds, breeding pairs and nest location in the exhibit.**

Note the presence of male/male pairs - these may be bachelor groups of two instead of actual pairs. Sex classes were determined by DNA-typing.

Species	ID	Age (yrs)	Sex	Sex Class *	Pair	Burrow **
Tufted	1	4	M	MMT	1	12
Tufted	2	4	M	BMT	3	1
Tufted	3	4	M	BMT	3	1
Tufted	4	4	F	MFT	2	9
Tufted	5	4	F	MFT	1	12
Tufted	6	7	M	MMT	2	9
Tufted	J	1	F	na	na	na
Common	L	4	M	BMC	4	4
Common	R	9	M	BMC	4	4

\* Sex classes are designated as MMT=mated male Tufted puffin, BMT=bachelor-paired male Tufted puffin, MFT=mated female Tufted puffin, BMC=bachelor-paired male Common puffin..

\*\* See Figure 1.

## **Breeding and Incubation Behavior of Captive Puffins, Continued**

The puffins have been housed in the Waters Biome in a mixed-species exhibit with 9 Common murres (*Uria aalge*) and one Black-legged Kittiwake (*Rissa tridactyla*) since 1988. The enclosure is designed to simulate the natural habitat of northern coastal seabirds. Rockwork containing 13 nestboxes, or "burrows", and a 16,800 liter (4438 gal.) pool (7.3m x 1.2m x 1.4m) [24ft. x 4ft. x 4.3ft] with artificial waves resemble a rocky coastline. Air and water temperature were 7.2° C ( 45° F). Daylength is set to that of Kodiak Island, AK by a computer lighting system . Puffins had year-round access to all burrows. Burrows consisted of short tunnels leading to nestboxes which provided approximately 1.3 square meters [ 14 sq. ft.] of nesting space.

Behavioral data on birds identified by leg bands was collected from 28 May 1991 through 26 July 1991. The birds were divided into four sex classes. Birds were classified as mated or bachelor-paired, male or female, and by species (Common or Tufted puffin). This allowed comparisons to be made between sexes (mated female Tufted vs mated male Tufted puffins); between species (bachelor-paired male Common puffins vs bachelor-paired male Tufted puffins); and between mated and unmated birds (bachelor-paired male Tufted puffins vs mated male Tufted puffins).

The observation period was divided into five biologically significant periods of approximately 8 to 10 days with a one-week break in observations between periods 2 and 3. The first period included breeding and egg laying. Both mated Tufted pairs laid a single egg. Pair #1 consisted of Tufted puffins 1 &5, pair #2 consisted of Tufted puffins 4&6. The two mated pairs (Tufted puffins) incubated during periods 2 and 3 with pair#1 losing their egg at the end of period 2. The second pair lost their egg at the end of period 3. During period 4, pair #1 and pair#2 dismantled their nests and searched for alternate burrows. In period 5, mated pairs had abandoned their incubation burrows and all birds began moulting.

Pairs had formed and breeding behaviors were already present before observations began. Breeding pairs were maintained from the previous year but pairs chose different burrows. Both pairs established a home burrow during the breeding season and these burrows were maintained through incubation. Bachelor male pairs occurred in both Tufted and Common puffins due to the shortage of females. These pairs also established home burrows. The juvenile female did not form a pair and was excluded from our analysis.

An initial observation covering all daylight hours in the exhibit (24 May 1991 = 0200 to 2100) showed the puffins were most active from 0400 to 2100. In order to record each bird's behavior through this entire 17 hours, we developed an alternating schedule of observations: one day observing 0800 to 1700, the next day 0400 to 0800 and 1700 to 2100, etc.

Observers seated outside the exhibit continuously recorded maintenance, social, breeding and incubation behaviors. The exhibit was divided into 6 quadrats, 1 through 5 on land, 6 being water (Figure 1) and locations of birds were tracked to determine use of the exhibit.

Behaviors (Table 2) were recorded in one of two ways, frequencies or durations. Those recorded as frequencies included gape, bow, look down burrow, landing display, and rise up/wing flap. Those reported as duration were billing, beaking, head flick, head jerk, head jerk/wing shake, fighting, low profile walk, pelican walk, nest gathering, burrow entrance, in burrow, eating, preening, in water, sitting, and standing. Behaviors recorded as durations were defined as mutually exclusive events. Total frequency of occurrence or percentage time spent in each behavior per hour of observation was calculated for the six adult Tufted puffins and the two Common puffins for each period.

Eggs were weighed approximately every two weeks in an attempt to determine fertility (Table 3). Over a normal incubation period eggs are expected to lose 11-13% of their weight (Wehle, 1980). Pair #1 terminated incubation after 27 days, and pair #2 after 44 days. Normal incubation for Tufted puffins in the wild is 45-46 days (Johnsgard, 1987). Egg loss for pair #1 was not directly observed (the egg was found floating in the pool) but the female from pair #2 was seen dropping the eggshell from their burrow entrance. After egg loss

## Breeding and Incubation Behavior of Captive Puffins, Continued

both pairs abandoned their respective burrows and moved to another burrow. During incubation, percent time spent incubating by female alone, male alone, both male and female, and neither bird (eggs unattended) was calculated.

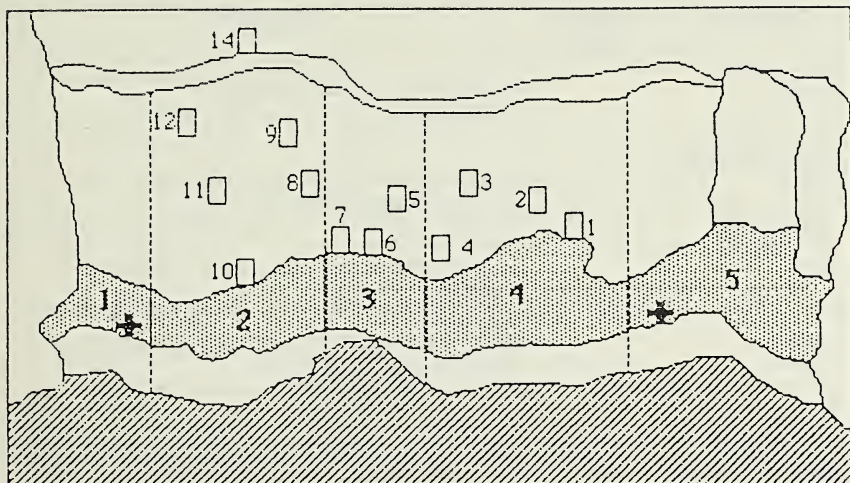


Figure 1 - Northern Rocky Shores Exhibit at the Indianapolis Zoo

Burrows numbered 1 - 14, Quadrats numbered in bold 1 - 5. Cross is position of food dish.

■ represents indoor / outdoor carpeting, □ represents rock work, and ▨ represents the pool

Behavior within the burrow was unobservable; however, communication between incubating birds in the nestboxes was monitored by microphones. These were wired to the front of the exhibit where audio equipment was set up to broadcast vocalizations to zoo visitors. Vocalizations were recorded both by observers and on audiotape.

Exhibit usage, maintenance, social, and breeding behaviors were analyzed by the general linear model procedure. Main effects [sex class (SC), period(P)] and their interaction were tested against the interaction nested within individual birds. Incubation data was tested by a general linear model with main effects (pair, incubation status) and their interaction tested against the residual. Comparisons within a pair were done using a t-test with unequal variance.

## Results and Discussion

**Exhibit Usage** - Sex classes differed in percent time spent in the six quadrats of the exhibit. Bachelor-paired male Tufted puffins spent less time in their home quadrat than mated male Tufted puffins (68 vs 79%,  $p=.01$ ). These sex classes also differed in time spent in quadrats adjacent to their home quadrat (22 vs 5%,  $p=.0001$ ) and time spent two or more quadrats away from home (3 vs 7%,  $p=.03$ ). Of the bachelor-paired males, Common puffins spent less time in quadrats adjacent to their home quadrats than Tufted puffins (15 vs 22%,  $p=.04$ ). Of the mated Tufted puffins, females spent less time in water (5 vs 9%,  $p=.006$ ) than males.

Burrow usage was significant for sex class by period interaction ( $SC \times P$ ,  $p=.04$ ). Incubation during the first two periods resulted in higher burrow usage by mated birds than bachelor-paired birds (Figure 2). During incubation mated female Tufted puffins spent approximately twice as much time in burrow as their mates. In period 3, immediately after egg loss for pair #1, mated female Tufted puffins decreased time spent in burrow ( $P2=88$



## Breeding and Incubation Behavior of Captive Puffins, *Continued*

Table 2 - Description of Behaviors

Description of behaviors used during observation. Adapted from Wehle (1980) and Harris (1984).

Behaviors	Abbreviation	Description
<i>Exhibit Usage</i>		
In Burrow		Bird in burrow, not visible to observer.
Burrow Entrance		Bird in opening of burrow or on ledge near opening
<i>Maintenance Behaviors</i>		
Preening		Bird draws feathers through the bill to coat with oil or rubs feathers on chest with bill.
Rise up / Wing Shake	RU/WS	Bird stretches up, fluffs feathers, shake wings and tail, and then settles down.
Stand		Bird supported by at least one leg and not engaged in any other behaviors.
Sit		Bird crouched, head tucked or not, and not engaged in other behaviors.
Eating		Bird seen eating a fish. Eating was recorded until the bird walked away from the food dish.
In Water	IW	Bird in pool and not engaged in any other behaviors.
<i>Social Interactions</i>		
Low Profile Walk	LPW	Bird walks rapidly in brief spurts with body hunched over.
Pelican Walk	PW	Bird holds itself stiffly erect moving in a slow stylized manner.
Gaping		Bill is slightly open, tongue may be visible.
Fighting		Birds interlock beaks and may use wings and claws to fight opponent.
Look Down Burrow.	LDB	Bird stands near burrow entrance and peers down into the burrow.
Landing Display	LD	After landing, bird stands hunched with wings extended for one to two seconds.
<i>Breeding Behaviors</i>		
Head Flick	HF	Head thrown up, back and down again with beak held closed
Head Jerk	HJ	Similar to head flick but beak is open. May be accompanied by vocalization.
Head Jerk / Wing Flap	HJWF	Head jerk with flapping wings.
Bowing		Bird briefly dips body parallel to the ground.
Billing		Pair of birds lower heads and swing bills from side to side, striking the lateral surfaces.
Beaking		Similar to billing but bills remain open.
Nest Gathering	NG	Picking up, pulling, or carrying materials from the exhibit (carpet fibers, rocks, feathers, etc)

Table 3 - Egg Weight Measurements for Tufted Puffin Breeding Pairs

Normal weight loss over 45 day incubation is 11-13% (Wehle, 1980). Egg loss occurred at 27 days for Pair 1 and 44 days for Pair 2.

Breeding Pair ID #	Egg Weight		% Loss in Egg Weight	
	Initial (g)	% Female Body Weight	At 14 Days	At 28 days
1	87.3	12.1	6.07	na
2	92.1	13.5	5.65	8.80

## Breeding and Incubation Behavior of Captive Puffins, Continued

vs P3=59%). This reflects the abandonment of old burrows and shows the increased activity involved in choosing a new burrow. Mated female Tufted puffins exhibited a similar decrease in burrow usage during period 4 (37%), when pair #2 lost their egg. When the mated pairs established new home burrows, burrow usage again increased (P5 = 55%). The second increase in burrow usage may be an artifact of captivity. Birds in our study were restricted to the burrow habitat and were not free to return to the sea. Confinement may have caused higher burrow usage after egg loss in our birds compared with records of wild puffin behavior.

With the exception of mated female Tufted puffins, all sex classes showed an increase in burrow usage across time. The initial increase in burrow usage for bachelor-paired male Tufted puffins may be attributed to failure to obtain a mate and the resultant end of mating season. Later increases in burrow usage are complicated since birds began exploring multiple burrows. This increased activity may have caused subordinate (bachelor-paired) birds to withdraw into their burrows to avoid encounters with other birds.

**Maintenance Behaviors** - Sex class and SCxP effects were significant for preening (SC  $p=.01$ , SCxP  $p=.004$ ). Mated Tufted puffins (both sexes) spent less time preening during incubation than at other times, having the two lowest scores in period 1 and the highest in period 5 (Figure 3). This may have been an actual decrease in preening behavior, or preening levels may have remained constant and observed changes were the result of observers' inability to see inside the burrows. Bachelor-paired male Common puffins showed a dramatic increase in preening during period 2 with time spent in burrow dropping proportionately to the increase in preening during this period (Pearson's  $r = -.95139$ ,  $p=.004$ ). Decreased preening in period 3 for bachelor-paired male Tufted puffins may have been caused by more time spent in burrow.

No significant differences by SC, period, or SCxP were found for standing, sitting, eating, or time spent in water. Due to differences in recording methods between observers, time spent performing rise up/wing shake was not analyzed.

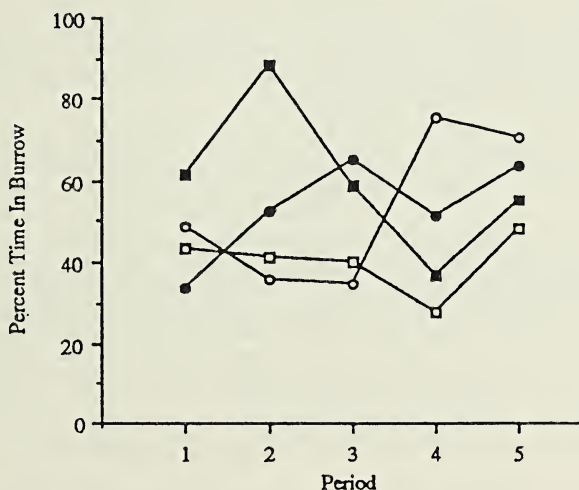
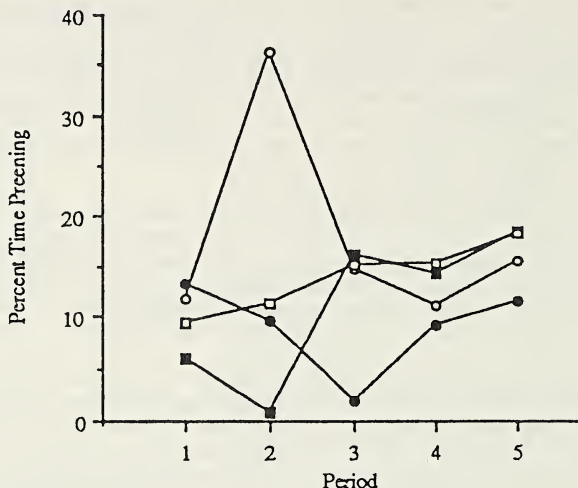


Figure 2.- Comparison of burrow use by period according to sex class.

Sex class labeled as follows: Bachelor-paired male Common puffin (○), Bachelor-paired male Tufted puffin (●), Mated female Tufted puffin (■), and Mated male Tufted puffin (□).



**Figure 3.- Comparison of preening behavior by period according to sex class.**

Sex class labeled as follows: Bachelor-paired male Common puffin (○), Bachelor-paired male Tufted puffin (●), Mated female Tufted puffin (■), and Mated male Tufted puffin (□).

*Social Interactions* - Gaping was significantly higher during the breeding season than during incubation (0.8 vs 0.1 gapes/hr,  $p=.002$ ). Home territories were established in the breeding season and the increase may be attributable to territoriality and mate defense. Mated Tufted puffins (both sexes) exhibited the highest and lowest levels of gaping, respectively (male=0.34, female= 0.08 gapes/hr;  $p=.02$ ) while bachelor-paired birds (both species) exhibited intermediate levels of gaping activity (Common puffins = 0.21, Tufted puffins = 0.26 gapes/hr). These results tend to support the belief that gaping is a male behavior which increases in frequency in mated birds.

Levels of low profile walking (LPW) and landing displays (LD) also showed responses to the breeding status of the colony. Increased territoriality due to breeding and incubation caused an increase in time spent LPW in periods 1 and 2 as compared with periods 3 through 5 (3.2 vs 0.3%,  $p=.0001$ ). LPW, a submissive, placative behavior, is used to avoid stimulating an attack when entering another bird's territory. LPW occurred most frequently in bachelor-paired male Tufted puffins (2.2%,  $p=.02$ ). This may be because the least dominant individual was a member of this sex class and these birds spent a larger proportion of time away from their home quadrat. Bachelor-paired male Common puffins, who consistently spent 70-90% of their time in their home quadrat, showed the lowest level of LPW (1.0%). Frequency of landing displays for the entire colony decreased at the end of the breeding season and again after egg loss ( $P1=.04$  LD/hr,  $P2=.02$  LD/hr,  $P3$  through  $P5=0$  LD/hr,  $p=.02$ ).

Fighting, pelican walk, and look-down-burrow had no significant differences.

*Breeding Behaviors* - Significant effects by sex class occurred for head flick (HF, $p=.0001$ ), head jerk (HJ, $p=.002$ ), and head jerk/wing flap (HJWF, $p=.005$ ). While females never exhibited HF, HJ, or HJWF, all male sex classes performed at least one of these activities suggesting that this group of breeding behaviors is restricted to males. Due to species differences bachelor-paired male Common puffins were seen to mostly HF while bachelor-paired Tufted puffins mainly HJ, and mated male Tufted puffins only HJ. Higher levels for all three of these behaviors for bachelor-paired Common puffins may be the result of



## **Breeding and Incubation Behavior of Captive Puffins, Continued**

this species using these behaviors in many contexts (breeding, aggression, coaxing females into burrows, etc.) while Tufted puffins always associate these behaviors with breeding (Johnsgard, 1987).

Head jerk and head jerk/wingflap also had significant SCxP (HJ  $p=.0002$ , HJWF  $p=.0005$ ). Mated male Tufted puffins show more time spent HJ and HJWF in period 1 due to breeding and lower levels in periods 2 and 3 due to incubation (HJ=0.8 v s 0.2 and 0.1%, HJWF=0.4 vs 0.1 and 0.1%). HJ shows an increase through periods 4 and 5 after egg loss (0.9 and 0.7%). Egg replacement is known to occur in the wild and males may have been trying to court and rebreed the females to produce a second egg.

Billing was high for all sex classes early in the breeding season (3.1 vs 0.9%,  $p=.01$ ) due to courtship and pair bonding. Of the bachelor-paired males, Tufted puffins beaked significantly more than Common puffins (1.25 vs 0.01%,  $p<.05$ ). As both sexes of mated Tufted puffins exhibited intermediate levels (0.82%) this appears to be mainly a Tufted puffin behavior.

Bowing was exhibited only in period 1 and only by male birds (bachelor-paired male Common puffins = 0.04, bachelor-paired male Tufted puffins = 0.13, and mated male Tufted puffins = 0.13 bows/hr, respectively, period  $p=.0001$ , SCxP  $p=.015$ ). Bowing is known to be an invitation to bill and the high levels occurring in period 1, associated with increased billing, was as expected. As courtship ended and levels of billing decreased, incidence of bowing dropped to zero.

Significant SCxP effects were found for amount of time spent nest gathering (NG,  $p=.04$ ). Bachelor-paired male Tufted puffins show a marked increase in NG during periods 3 and 4. This may be an effect of the dismantling of Pair #1 and #2's unsuccessful nests. During this process, feathers were repeatedly dropped out of the burrow entrance and reclaimed by other birds. Bachelor-paired male Common puffins spent the least time NG of all the sex classes while bachelor-paired male Tufted puffins spent the most (0.2 vs 1.2%,  $p=.003$ ).

*Incubation* - Mated pairs differed in the proportion of time spent incubating by males and females. In Pair #1, incubation duties were evenly shared between the male and female (male alone=15%, female alone=18% out of total time incubating) while, for Pair #2, the male spent less time incubating alone than the female (21 vs 40%,  $p=.008$ ). For the entire study, small differences existed between pairs for amount of time spent incubating by female only (Pr #1=20% vs Pr#2=30% out of total time incubating,  $p=.06$ ). No differences were found between pairs for incubation by males alone, both birds, or time egg was left unattended. The egg was rarely observed completely unattended in contrast to field reports where the egg may be left unattended for hours.

Both pairs abandoned their burrows after egg loss and quickly set up a new home burrow. Comparing values before and after egg loss for incubating pairs, significant differences exist for percent time in incubation burrow for males only (31 vs 1%,  $p=.001$ ), females only (48 vs 1%,  $p=.0001$ ), and neither bird (4 vs 93%,  $p=.0001$ ). A trend also existed for both birds incubating (17 vs 4%,  $p=.06$ ).

*Vocalizations* - Both pairs performed "purring" and "bi-syllabic" calls during incubation as described by Wehle (1980). "Bi-syllabic" calls appeared to be most frequent during switching of incubation duties. We were unable to monitor vocalizations after birds abandoned their incubating nestboxes.

## **Conclusion**

Despite differences between the exhibit and the natural habitat, both species in our study appeared to display most of the breeding behaviors performed in the wild. Birds exhibited HF, HJ, HJWF, billing, beaking, bowing and NG similar to descriptions of wild puffin breeding behavior (Wehle, 1980; Harris, 1984).

## **Breeding and Incubation Behavior of Captive Puffins, Continued**

The space constraints of the zoo habitat had an impact on the number and variety of both aquatic and aerial behaviors that the birds were able to display. Birds were unable to perform many behaviors associated with arrival at the colony such as milling, wheeling, and the normal pattern of cyclic attendance prior to breeding (Harris, 1984). The inability to perform these behaviors may have caused behavioral and physiological changes in the birds contributing to reduced reproductive success.

The low number of birds and the sex ratio present in the exhibit may have reduced reproductive success. Harris(1984) found that birds in large colonies bred more successfully than birds in small colonies. He also suggested that the sex ratio in wild populations is approximately even. Sex ratio in the exhibit was 4 males:2 females for Tufted puffins and 2:0 for Common puffins. With only two females present, a Tufted male may have been forced to remain with a female even after an unsuccessful season.

Egg loss was most likely due to infertile eggs as no evidence of embryos were found. Infertile eggs may have been caused by unsuccessful copulations. In the wild, copulations occur at sea and are followed by mutual wing-flapping (Wehle, 1980). In our study most copulations occurred on land with no evidence of mutual wing-flapping. This may be evidence of incomplete copulations.

Even with successful copulation, young birds may be less capable of producing and successfully hatching an egg. Our birds mated approximately 1-2 years earlier than reported matings of wild birds at 5-6 years of age (Wehle, 1980). Physiological and behavioral differences due to early maturation may have resulted in reduced breeding success.

In the exhibit, pairs abandoned and dismantled nests immediately after egg loss compared with reports of nest cleaning in the subsequent year for successful birds in the wild (Wehle, 1980). Space restrictions in the exhibit prevent migration, forcing our birds to occupy neighboring burrows year-round; therefore, they may have instinctively attempted to decrease predation risk by cleaning the nest of both egg shell and nesting material.

### **Suggestions**

The following examples will demonstrate how knowledge of puffin behavior from both captive and field studies can be used in the development of a puffin management program.

1. Because of field reports of burrow abandonment due to human disruption, great care should be taken in any activity around the nest during the breeding season (Wehle, 1980). To reduce the effects brought on by handling the eggs, birds should be habituated to human presence at the nest.
2. Considering the high levels of nest gathering activity present in our study, providing more nesting materials may prove beneficial. Common nesting materials in the wild include grasses, stalks of umbels, and feathers (Wehle, 1980).
3. Light intensities are known to have an effect on reproductive function in birds. Experimenting with different lighting schemes, for example using brighter lights in breeding season and dimmer in non-breeding periods, may improve reproductive success.

### **Acknowledgements**

Our thanks to all those at the Indianapolis Zoo who made our work possible and to Dr. Harold Gonyou and Dr. Ron Larkin for their help and comments. In addition, we would like to thank Steve Sarro, Senior Keeper/Birds at Baltimore Zoo, and Bruce Bohmke, Curator of Birds at St. Louis Zoo, for their reviews of our paper.

### **Literature Cited**

- Harris, M.P. 1984. The Puffin. T and AD Poyser Ltd., London, England
- Hediger, Heini, 1964. Wild Animals in Captivity. Dover Publications, Inc., NY, NY.
- Johnsgard, Paul A., 1987. Diving Birds of North America. University of Nebraska Press, Lincoln, NE.
- Wehle, 1980, D.H.S., 1980. The Breeding Biology of The Puffins: Tufted Puffin (*Lunda cirrhata*), Horned Puffin (*Fratercula corniculata*), Common Puffin (*F. arctica*), and Rhinoceros Auklet (*Cerorhinca monocerata*). Ph.D. dissertation. University of Alaska.





# Chapter News

## San Diego AAZK Chapter

At our August program Chapter members and guests were treated to a fascinating lecture, "Everything You Always Wanted to Know About Hummingbirds but Were Afraid to Ask!", by SDZ Senior Bird Keeper Denise Gillen. Denise has been a bird keeper at the Zoo since 1976, and sets up hand-rearing protocol for the zoo's hummingbird collection.

Denise showed a video of her work at Ramsey's Canyon Natural Reserve in Arizona where hummers caught in mist nets are banded, weighed, and their beaks, wings and tail feathers are measured. Pollen samples are taken from their beaks. All data is recorded and later computerized

Denise presented an array of beautiful slides as she touched on the history of hummingbirds (dating back to the Aztecs), their distribution, and the recent discovery of the Tooth-Billed hummingbird found in Panama and Ecuador. Everything about the hummer is astonishing. This New World bird can migrate 2,000 miles; fly at speeds up to 30 mph; and hovering, beat its wings 70 times a second (up to 200x a sec. with the courtship beat!); fly backwards; fly upside down; and fly in a figure eight. Full rotation of the wings enables these incredible maneuvers.

I must applaud and commend Denise and her co-workers at Ramsey's Canyon Nature Reserve for their amazing skill and technique in handling these gorgeous and delicate birds.

*--Mary Dural, Chapter Liaison*

## Greater Kansas City AAZK Chapter

Our officers for 1992 are:

President.....Jacque Blessington  
Vice Pres.....Norma Haynes  
Treasurer.....Theresa Schwang  
Secretary.....Kathy Moore  
Chapter Liaison.....Dale Frerking

In April we had our annual "Bowling for Rhinos". There was a really good turnout of 49 bowlers and the event raised \$3800.00.

In May, Andy Lodge and National Geographic were in Kansas City to film a segment for a special on zookeepers. The subject was "Bowling for Rhinos" and keepers.

On Monday, 12 October, Anna Mertz (founder Ngare Sergoi Rhino Sanctuary) is coming to Kansas City as one of her lecture stops. We are planning a supper/lecture fundraiser event for that evening.

Our Chapter has also adopted a stretch of roadway that we are responsible for clearing of litter and trash on a somewhat monthly basis.

Our Chapter designated all the money collected from aluminum recycling for the month of October to go into a fund for SSP projects, research, etc. Recently we sent last year's recycling profits to the Crane Foundation to help bring a crane expert from China to a workshop in Calgary. This year, we also purchased six receptacles for aluminum collection in public areas.

Recently the Chapter had a garage sale and raised \$155.00.

*--Dale Frerking, Chapter Liaison*

## River City Chapter

The John Ball Zoo Chapter, Grand Rapids, MI, has recently changed its name to the River City Chapter. Dana LaBlanc, Chapter Secretary, has recently accepted a position at the Lube Foundation in Gainesville, FL. We wish him the best of luck. Bruce Wojcik will fill this position for the remainder of 1992.

Our Chapter is planning our biggest "Bowling for Rhinos" yet which will be a big job since we raised \$5,867 in 1990 and \$4,236 in 1991! We also participate in an Adopt-A-Stream program with the West Michigan Environment Action Council.

*--Phyl Nilson-Wojcik, Pres.*



## Chapter News, Continued

### Little Rock Chapter AAZK

Greetings from the Little Rock Chapter. We have stayed busy this year as usual. As our conservation project this year, our Chapter decided to raise funds for Duke University Primate Center's projects in Madagascar. Several of us had the privilege of visiting their facilities last year, and were very impressed with their work here in the U.S. After reading more about the projects they sponsor in Madagascar, we voted to send any conservation funds raised to them.

Our first project was a bake sale during Senior/Kid's Day weekend in April. This was a first time effort for us, and after checking the local laws regarding nonprofit groups, we decided to try it. The one-day sale, which required minimal man-hours, raised \$140.00. We will be having a garage sale this fall.

We have successfully continued our recycling efforts. To date, approximately two and a half tons of cardboard have been recycled this year. Our aluminum recycling project is ongoing. Unfortunately, there currently is no local recycler who is taking plastic. Most of our income comes from coffee and soft drink machines in the employee break room.

During June our zoo celebrated Conservation Days. The Docent Council had various activities planned during the month, with Conservation Days on 20-21 June being the grand finale. A new feature was Keeper Tales, a brown bag lunch event offered each Wednesday at noon to members of the general public. Talks were given on various topics, and several of our members participated. This series was very well received.

For Conservation Days we manned a table with posters highlighting various conservation activities with which we've been involved. These included the ESP, "Bowling for Rhinos", Duke University Primate Center, and our recycling activities. We also manned a table during Zoo Days in August, which is our zoo's biggest event.

Our "Bowling for Rhinos" event was small, but lots of fun. We included a silent auction with items ranging from T-shirts to a guided fly fishing trip (it alone made over \$300.00). We raised \$1425.10 total. Our small group of enthusiastic participants deserve lots of credit for making this event a success.

Members of our Chapter are eligible to receive money to attend conferences and workshops. During the last 12 months, we have granted funds for keepers to attend the following: The Gorilla Workshop, the "Understanding Chimpanzees" Symposium, regional AAZPA and national AAZK conferences. Currently we limit the annual amount awarded to each member to \$100.00.

Our summer meetings are generally informal potluck dinners in a pavilion at the Arkansas River. This year we sponsored Mr. John Cobb from the Northwest Arkansas Zoological Society to speak on their efforts to bring a zoo and botanical gardens to that part of the state. Currently we are the only accredited zoo in Arkansas. Docents, staff, and zoo board members were invited to attend.

We also had a meeting at the zoo, since our night keepers have a difficult time getting to the meetings. Our latest meeting was at a nearby state park. A night hike had been scheduled by the park, so we barbecued, had our business meeting, and a few energetic souls then went on the hike. Our meetings are generally the first Wednesday of each month.

We'd like to have more speakers. Anyone traveling in the area is welcome to attend our meetings. If you'd be willing to give an informal presentation on your zoo, research you might be involved in, or anything of interest to zoo staff, we'd be more than willing to work around your schedule.

We're still selling colder holders, T-shirts and Sweatshirts featuring the AAZK rhino as our National project. Information about ordering these items is frequently listed in AKF. Don't forget to specify size and color preference when ordering shirts.

--Ann Rademacher, Sec'y

## Chapter News, Continued

### Bergen County Regional Chapter AAZK

Our second annual "Bowling for Rhinos" was held on 17 May. Due largely to the support of our docents and zoo society members, we are happy to have raised over \$1300.00.

Also in May, through the sale of Rainforest Crunch™ and a loan from our zoological society, our Chapter purchased an ESP Conservation Parking Meter. The Chapter officially presented the meter to the zoo during Conservation Day events on 6 June. To date the meter had made \$1600.00.

--Barbara Andriani, Chapter Liaison

### Baltimore Zoo Chapter

Our small Chapter is continuing to grow in 1992. Our fundraisers have allowed us to help send one of our members to the National AAZK Conference in San Diego. Our only wish is that we all could go!

At our September meeting, it was unanimously decided that we send a donation to the Miami Metrozoo to help with their rebuilding efforts after Hurricane Andrew. We felt that it was the least we could do to help another zoo, and we hope that other AAZK Chapters that are able will do the same.

We are also working on a zookeeper education display to take to special events. We have a very nice banner that was painted by one of the zoo's docents, and we are working on collecting photos and information to use on the display. There are always fairs and festivals in the area, and a well-presented display could do a lot to promote zookeeping as a career.

Our parking meters continue to bring in money for the Chesapeake Bay Foundation and the Bali Mynah Reintroduction Fund. We are very pleased with their success, and are working on the next meter which is going to support research on the Lion-tailed macaque. We hope to finish this meter over the winter and have it up and running next spring!

--Chris Bartos, Chapter Liaison

### Audubon Chapter AAZK

The Audubon Chapter has had a busy and productive year. Some of the projects we have been involved in are the Sister Zoo/ZCOG with the La Aurora Zoo in Guatemala, Earthfest, and Rockin' for Rhinos.

Two auctions were held to raise money for our sister zoo. Items auctioned consisted of Guatemalan masks, jackets, vests, weavings and jewelry. Over \$600.00 was raised at the first auction and \$500.00 at the second.

Our alternative to "Bowling for Rhinos" is Rockin' for Rhinos which was held 16 August at Mid City Bowling Lanes. Bands such as Dash Rip Rock, Swingin' Haymakers, Larry Garner & The Boogaloo Blues Band, Moving Targets, Barz Antone, and Wild Peyotes played. T-shirts and posters were also sold raising over \$3,000.00 for the Ngare Sengoi Rhino Sanctuary.

Our Chapter has also had some wonderful guest speakers. Sandra Skrei spoke to us about Zoo Conservation Outreach Group (ZCOG). We also have had several University of New Orleans professors speak on various animal topics.

--Elizabeth L. Bryant, Chapter Liaison

### Exotic Feline Breeding Compound

Help! We need Cougar slides for possible use in the upcoming Fabulous Feline Follies black-tie dinner. This event, which is supported by our Chapter, is the "biggie" that helps to raise money for natural habitats for breeding pairs of exotic cats. Anyone who may also be interested in donating any raffle or auction items can contact Julie Abraham, President, at the E.F.B.C. (805-256-3793). Thank you, one and all.

Just recently, the well went dry at our facility. Living in the high desert, this was nothing less than a catastrophe. We are currently laying a water line to hook up with the city system. It is costing the E.F.B.C. about \$32,000. Any assistance would be greatly appreciated.

--Johnny Merk, Chapter Liaison



# Salmonellosis at the Infant Isolation Unit Hoofstock Nursery San Diego Wild Animal Park

By

Debi Espinoza-Bylin, Senior Animal Keeper  
Infant Isolation Unit, San Diego Wild Animal Park  
Escondido, CA

## Introduction

Salmonellosis is an infectious disease caused by the bacteria *Salmonella*. It is known as a zoonotic disease due to its ability to be transferred between humans and animals. Distributed throughout the world, there are more than 1,7000 strains or serotypes (2,3). Since 1988, there had not been any known infections of *Salmonella* at the Infant Isolation Unit nursery at the San Diego Wild Animal Park Hospital. Its potential to spread in a hospital environment to compromised or stressed animals requires immediate and effective treatment. This case report and the following discussion is presented in an attempt to share useful information with other keepers.

## Clinical History

In November of 1990, a newborn male Malayan Sambar (*Cervus unicolor malaccensis*) was pulled to the Infant Isolation Unit for hand-raising. A dystocia or difficult delivery had left the neonate in a weak and compromised state of health. At four days of age, severe diarrhea prompted a rectal swab to be taken from which *Salmonella* spp. was isolated. Three weeks prior to the Malayan Sambar's arrival, *Salmonella* had not been isolated from rectal swabs taken from various neonates also at the Infant Isolation Unit. One month after the Malayan Sambar's arrival, rectal swabs of 15 animals revealed seven positive cultures of *Salmonella*. The other ungulate neonates housed at the Infant Isolation Unit had either direct contact, a short two-day contact, or no contact with the Malayan Sambar.

Of the seven animals in direct contact, six had positive rectal swab cultures of *Salmonella* and all seven of them developed diarrhea. These animals were 1 1/2 months of age or younger at the time of the initial outbreak of salmonellosis.

At 1 1/2 months of age, three (3) animals had a short, two-day contact with the *Salmonella* group before being moved, but rectal swabs revealed no enteric pathogens a month after that contact.

Five animals, two months of age and older had no direct contact with the Malayan Sambar yet the youngest animal in this group tested positive. This positive result was after the group with the short contact was moved in with these older (no contact) animals.

Routine immunoglobulin tests (Bova-S, V.M.R.D., Inc., Pullman, WA 99163) revealed a higher incidence of salmonellosis in immunoglobulin deficient neonates. Three of four negative Bova-S (or immunodeficient) animals contracted salmonellosis, while only five of 12 positive Bova-S animals became infected.

Ten animals were given Septra® (sulfamethoxazole & trimethoprim) orally BID x 5 days as treatment for *Salmonella* or for their diarrhea. However, five animals were *Salmonella*-positive in as little as five days after the end of treatment.

## Sanitation

After the initial outbreak, a strict sanitation protocol was set up at the Infant Isolation Unit. coveralls and disposable gloves were used around the affected animals and footbaths with 1-Stroke Environ (phenol germicidal disinfectant) were used for personnel both entering and



## **Salmonellosis at the Infant Isolation Unit SDWAP, *Continued***

exiting any affected areas. Disinfection of exposed skin with Nolvasan® Surgical Scrub (chlorhexidine disinfectant) and inanimate objects with A-428 (quaternary ammonium disinfectant) was instituted. Disposal of contaminated feed and bedding was separate from other hospital wastes as was the use of separate cleaning implements.

As with most cleaners, organic matter should be rinsed off first for the disinfectant to be most effective. Complete drying of disinfected areas also further decreases the number of pathogens.

### **Transmission**

It seemed likely that the Malayan Sambar was the carrier of *Salmonella* into our nursery yet there were many possible routes of transmission for that animal to become infected.

Extremely resistant, salmonellae can survive in dried cow manure for over 30 months, in water for eight days, and even extremes of temperature, down to freezing (2). The soil could have been contaminated at the time of the Malayan Sambar's birth, however none of the animals in that exhibit showed clinical symptoms of salmonellosis. The difficult delivery could have caused the dam to shed the organism in a vaginal discharge or in milk immediately following parturition, an occurrence that is not uncommon (1,4). The dystocia could also have predisposed the neonate to become infected. Stress is a known factor in the shedding and pathogenesis of this disease. A weakened state prevented the Malayan Sambar from receiving a routine Betadine bath which could have prevented him from becoming infected if he had not yet ingested the bacteria.

The very young are at the greatest risk of infection due to their underdeveloped immune system. Accordingly, the animals 2 1/2 months and older were the ones most resistant to infection at the Infant Isolation Unit. Other high risk groups include animals that are very old, debilitated or stressed (3,4).

Most animals become infected through ingestion of salmonellae contaminated feces or urine but inhalation is also possible. It can be passed by any vector such as flies, rodents, birds and humans. Personal hygiene is crucial to prevent infection to keepers as well as to other animals.

### **Symptoms**

The clinical symptoms and severity of the illness vary due to several factors, such as the virulence of the organism, the amount of the infecting dose, and to a small part, previous exposure. The amount of the dose ingested to cause disease does vary with the virulence of the strain. Some animals can tolerate small doses of virulent strains or relatively large doses of less-virulent strains without becoming clinically ill (2). Therefore, sanitation becomes extremely important to keep the number of any harmful organisms at a low level.

There are several clinical syndromes of salmonellosis which vary from mild to severe. The most common symptoms include fever, dullness, anorexia and profuse, foul-smelling diarrhea. The stools can contain blood, mucus, and fibrinous casts. The neonate can lose condition quickly and become dehydrated, weak and emaciated (2,3,4). Neonates that survive this acute enteritis will shed salmonellae in their feces for a few weeks, heavily contaminating an area, but will not usually become chronic carriers as would adults (4). Diarrhea may not be present in all forms of the infection and the salmonellae may only be shed intermittently. Thus, a symptomless carrier state can exist and an animal may only develop clinical symptoms when stressed as when giving birth, in transport, or when the normal gastrointestinal flora is altered. Therefore, the animals with the negative rectal swab cultures could have been infected but were just not shedding at the time of the rectal swabs. Two to five consecutive negative tests have been recommended in the literature before an animal is considered a non-shedder (2,3,4). However, two consecutive negative tests were more practical in our facility with two weeks between the tests.

### **Drug Therapy**

Although a drug's *in vitro* sensitivity test results are not always indicative of its effectiveness on the live animal, the final selection of any medication should be based on culture and sensitivity results (2,3,4). This is especially important since different strains of *Salmonella* are sensitive to different drugs plus they can also develop a resistance to medication over time.

The response of medication at our facility did not produce a consistent trend as to which medication was more effective since the treated animals were just as likely to remain positive as the non-treated animals. Although Septra® was the drug most commonly prescribed (Gentocin® (gentamicin sulfate), Omnipen® (ampicillin sodium), Di-trim® (trimethoprim & sulfadiazine 24%, and Naxcel® (ceftiofur sodium) were also used. Unfortunately, antibiotics can also work against a ruminant by altering the natural balance between resident flora and harmful pathogens and may actually trigger the clinical symptoms of the disease (2). Some of the animals on antibiotics prior to the outbreak could have had a decreased ability to resist infection due to this alteration of their normal gut flora.

Animals can be vaccinated with a killed bacteria but it must contain the exact serotype as the causative organism to be effective (1). Worldwide, there are 11 strains of *Salmonella* for bovines alone (3).

In light of this, various references recommend a broad-spectrum antibiotic given parenterally and at the highest approved dosage. Antibacterial drugs may also be useful in controlling other opportunistic pathogens complicating a *Salmonella* infection. Repeated reinfections with the same serotype or with one or more serotypes are not unusual, demonstrating that little if any immunity is induced by infection (2,3).

### **Fluid Therapy**

There were no fatalities due to salmonellosis at our facility. Our experience with raising ungulate neonates has shown us that any animal less than two weeks of age should take in at least 10% of its body weight in fluids per day. This fluid requirement increases when a neonate has diarrhea. The fluids are normally given orally using an artificial milk formula but when a fluid deficit exists, isotonic fluids can be injected subcutaneously. Severe dehydration would necessitate intravenous fluid.

Calves with diarrhea have a reduced ability to digest and absorb substances in their intestinal tract (4). Switching to a readily absorbed glucose-electrolyte mixture for 24 hours can be tried to help control the diarrhea and prevent further dehydration.

### **Conclusion**

The best medicine, therefore, seems to be prevention through sanitation, especially of new animals coming into a facility and, isolation of any possible carriers. Once an animal is infected, however, prevention of the debilitating effects of dehydration using supportive fluid therapy seems to be the best approach until the animal's own immune system can overcome the infection.

### **References**

- 1). Bryans, J.T. 1972. Salmonellosis. in: Catcott, E.J., and J.F. Smithcors (eds.). Equine Medicine & Surgery, 2nd Ed. American Veterinary Publications, Inc. Wheaton, IL. pp. 82-85.
- 2). Kohn, C.W. 1982. Acute Diarrhea. In: Mansmann, R.A., E.S. McAllister, and P.W. Pratt (eds.). Equine Medicine & Surgery, 3rd Ed. Vol. 1. American Veterinary Publications, Inc., Santa Barbara, CA. pp. 528-541.

### Salmonellosis at the Infant Isolation Unit SDWAP, Continued

- 3). Morse, E.V. 1980. Salmonellosis. In: Amstutz, H.E. (ed.). Bovine Medicine & Surgery, 2nd Ed. Vol. 1. American Veterinary Publications, Inc. Santa Barbara, CA. pp. 2230228.
- 4). Radostits, O.M. and S.D. Acres. 1980. Herd Health Management. In: Amstutz, H.E. (ed.). Bovine Medicine & Surgery, 2nd Ed. Vol. 1. American Veterinary Publications, Inc. Santa Barbara, CA. pp. 21-61.



## Environmental Career Conference To Be Held in Seattle

The Environmental Careers Organization will hold its National Environmental Career Conference and Career Fair on 20-21 November 1992 at the University of Washington in Seattle. Over 800 undergraduate students, graduate students, career changers, career counselors, professors, industry experts and environmental professionals are expected to attend. Conference sessions will address career opportunities in growing fields such as hazardous waste, fish and wildlife preservation, water and air quality; professional options including types of employers and graduate schools; and strategies for obtaining an environmental career.

The keynote speaker will be Paul Hawkins, founder of Smith & Hawkins, Inc. an award winner of the Council on Economic Priorities for Environmental Stewardship, and best-selling author of Growing A Business and The Next Economy. Hawkins is best known for his work as a leading-edge, progressive environmentalist with a deep understanding of the economic realities in a capitalistic society. Session speakers and Career Fair exhibitors will represent dozens of federal and national environmental agencies, corporations, consulting firms and nonprofit groups.

Since 1972 the Environmental Careers Organization has been dedicated to the protection of the environment through the development of professionals, the promotion of careers, and the inspiration of individual action. They're located at 286 Congress St., Boston, MA 02210-1009 - (617) 426-4375. Contact person for the event is Kellie Lawless.



### *Endangered Species Posters Available*

"Endangered Means There's Still Time" is the first in a series of posters which feature endangered species from a variety of different habitats. This first poster highlights six species native to coastal areas: the San Francisco garter snake, the California clapper rail, the Mission blue butterfly, Menzies' wallflower, the Brown pelican, and the Leatherback sea turtle. "Cats of North America" is the second poster in a series which began with birds of prey ("Raptors: Hunters on the Wing"). It depicts five native cats: the Ocelot, the Florida panther, the Lynx, the Mountain lion, and the Bobcat. These posters are designed to raise public awareness of lesser-known types of wildlife found in North America.

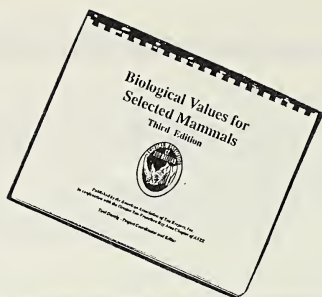
Posters may be ordered by writing the Superintendent of Documents, Washington, DC 20402, or by calling (202) 783-3238. "Endangered Means There's Still Time" (product # 024-010-00693-5) is available for \$4.75. "Cats of North America" (product # 024-010-00694-3) is available for \$5.50. "Raptors: Hunters on the Wing" (product # 024-010-00687-1) remains available for \$3.50.





Now Available

# Biological Values for Selected Mammals Third Edition - 1992



AAZK, Inc. is pleased to announce the availability of Biological Values for Selected Mammals, Third Edition. This important reference work is a project of the Greater San Francisco Bay Area Chapter of AAZK and was the result of thousands of hours of volunteer time spent in collecting data, doing computer entry, editing, proofreading, etc. Project Coordinator and Editor was Toni Danzig of San Francisco.

This Third Edition differs in a number of respects from the previous two editions. This 1992 edition is published in an 8 1/2 by 11 inch format and is comb-bound. It contains information on 457 species of mammals and covers values ranging from geographic range and habitat to Circadian cycle, size/measurements, reproductive data, life expectancy, body temperature, rearing information and status in the wild to name a few. About half of the species listings also include habitat range maps. Every attempt has been made to use only the most widely accepted scientific resources for data gathering. The volume contains a complete bibliography of references utilized.

Biological Values for Selected Mammals - Third Edition may now be ordered through the AAZK Administrative Offices. Please fill in the form below and return with your check or money order (U.S.FUNDS ONLY) to: BV III, AAZK, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK, Inc."

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*Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/ **AKF**, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for this service and phone-in listings of positions which become available close to deadline are accepted. Our phone is 1-800-242-4519 (U.S.); 1-800-468-1966 (Canada). Our FAX is 913-273-1980.*

**MAMMAL KEEPER**...full-time keeper requires experience with ungulates, cougars, cheetahs and primates. Degree or equivalent zoo related experience. Daily duties include mammal care, habitat upkeep, breeding programs, record keeping, training, acquisitions, etc. Must be willing to work weekends/holidays. Starting salary \$15,000-\$17,000 with year-end bonus and excellent benefits. Excellent growth potential. Salary commensurate with experience. Send resume/references to: Peter A. Rittler, Administrator, Washington Zoological Park, 19525 SE 54th, Issaquah, WA 98027. Position open until filled.

**ANIMAL KEEPER (Bird Dept./Baltimore Zoo)**...each candidate must have one year's experience in the care and handling of a variety of birds, excluding pets; or have 6 month's experience in the care and handling of animals in a zoological institution or have a Bachelor's degree from an accredited college or university in biology, zoology, animal science or veterinary technology. Under direct supervision of a Senior Keeper and/or Curator. Send resume to: Personnel Dept., Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217.

**CHIMPANZEE CAREGIVER**...a new position has been made available. Requires BA/BS in Zoology, Biology, Anthropology or related fields of study and ability to work well with peers. Primate or zoo experience preferred. Assist in the responsibility for maintaining and caring for approximately 86 chimpanzees (*Pan troglodytes*). Must be willing to make at least a two year commitment. Salary negotiable. Position open until filled. All applicants must have a negative T.B. skin test, negative hepatitis B surface antigen blood test, and evidence of a measles booster or natural disease prior to employment. Equal Opportunity Employer. Excellent benefits. Send letter of interest (with requested salary), resume and three letters of reference to: Jo Fritz, Primate Foundation of Arizona, P.O. Box 20027, Mesa, AZ 85277-0027.

**ZOOKEEPER ASSISTANT/Bird Dept/**...opportunity to participate in incubation/brooder facilities and off-exhibit avian propagation facility. Includes care of extensive bird collection and maintenance of exhibits. Requires high school diploma and/or biology degree or minimum of 1 year working experience. Starting salary \$17,700 per year with benefits. Submit resume **by 31 October 1992** to: Nancy Foley, Director of Human Resources, The Toledo Zoological Society, P.O. Box 4010, Toledo, OH 43609.

**ZOOKEEPER INTERNSHIP**...experience with a variety of animal taxa preferred but not required. Need to have good oral and written communication skills and be able to work well with the public and co-workers. Bachelor's degree in biology or related field and animal handling skills preferred. Responsibilities include daily care of a diverse animal collection, maintenance of exhibits and off-exhibit facilities, assisting with training of volunteers, and assisting with the development and presentation of educational programs. If you are interested, send a letter of interest and/or resume to: Tracy Divis, Grand Isle Heritage Zoo, 2103 W. Stolley Park Rd., Grand Island, NE 68801 (308) 381-5416. Position open until filled.

**WILDLIFE INTERPRETER**...responsibilities range from organizing and presenting live animal programs to doing television and radio interviews. Must have experience in handling/training animals, especially birds-of-prey, and be an excellent public speaker. Full-time position in a creative and challenging work environment. Salary \$8.80 per hour plus benefits. Please send resume to: Lou Feiring, The Living Desert, 47-900 Portola ave., Palm Desert, CA 92260. Position open until filled.

## Opportunity Knocks, Continued

The following two (2) positions are available at the Memphis Zoo & Aquarium. Closing date for these positions is **19 October 1992**. Interested persons should send (or FAX) letter of interest and resume to: Charles G. Wilson, Director, Memphis Zoo & Aquarium, 2000 Galloway, Memphis, TN 28112-9990 - FAX 901-725-9305.

**ZOO KEEPER**...requires high school diploma and six (6) month's animal care experience or equivalent. Ability to interact with public and volunteers in answering questions and complaints. The successful applicant will be responsible for providing general care for, maintaining surveillance and record keeping for all animals quartered in assigned area: perform related work of maintaining exhibits and grounds in assigned area; performs other related duties as assigned. Salary \$20,425.

**ASSISTANT CURATOR/MAMMALS**...requires Bachelor's degree in zoology or related field and minimum three year's progressive experience in caring for an animal collection and supervising experience, or equivalent combination of experience and education. Responsible for managing mammal care personnel and the mammal collection. Salary \$25,320 - \$31,651.

## Information Please



Anyone having any information on setting up and/or maintaining a bachelor group of Black and White Colobus monkeys (*Colobus guereza*) please contact: Sandy Elliott, c/o Walter D. Stone Memorial Zoo, 149 Pond Street, Stoneham, MA 02180.

Sedgwick County Zoo and Botanical Garden is interested in participating in keeper exchanges. Anyone interested in such an exchange should contact: Kristi Flanders, Senior Keeper, Sedgwick County Zoo & Botanical Garden, 5555 Zoo Boulevard, Wichita, KS 67212.

Bird keepers at the Memphis Zoo have recently raised a Hooded Pitta (*Pitta sordida*) from the egg. If any other institution has any information regarding the rearing of this species from the egg, please contact: Dena Mandino, Bird Dept., Memphis Zoo, 2000 Galloway, Memphis, TN 38112.

## **AAZK Announces New Professional/Contributing Members**

Laurie Macha, Mystic Marinelifelife Aquarium (CT)	Linda Tripp, Mystic Marinelifelife Aquarium
Robert Flook, NC Museum of Natural Science (NC)	Dennis S. Monroe, Riverbanks Zoo (SC)
Dawn Hernda, Sea World of Florida (FL)	Martha Thaden, Miami Metro Zoo (FL)
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## **Renewing Contributing Members**

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# AAZK Membership Application

Name \_\_\_\_\_ check here if renewal [    ]

Address \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ Zip \_\_\_\_\_

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## U.S. Members

- ☐ \$30.00 Professional/U.S.  
*Full-time Keepers*
- ☐ \$25.00 Affiliate/U.S.  
*Other staff & volunteers*
- ☐ \$25.00 Associate/U.S.  
*Those not connected with  
an animal facility*
- ☐ \$50.00 or up Contributing/U.S.  
*Individuals*
- ☐ \$50.00 or up Institutional/U.S.  
*Organizations/Institutions  
(requires Board approval)*

## Canadian Members

- ☐ \$35.00 Professional/Canada  
*Full-time Keepers*
- ☐ \$30.00 Affiliate/Canada  
*Other staff & volunteers*
- ☐ \$30.00 Associate/Canada  
*Those not connected with  
an animal facility*
- ☐ \$55.00 or up Contributing/Canada  
*Individuals*
- ☐ \$55.00 or up Institutional/Canada  
*Organizations/Institutions  
(requires Board approval)*

## International Members

- ☐ \$40.00 International  
*All members outside U.S. &  
Canada regardless of category*

## Library Only

- ☐ \$20.00 Library  
*Available only to  
established libraries*

Zoo Affiliation (if any) \_\_\_\_\_

Zoo Address \_\_\_\_\_

Title \_\_\_\_\_

Work Area \_\_\_\_\_

Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), made payable to American Association of Zoo Keepers, Inc., to : AAZK Administrative Offices, Topeka Zoo, 635 S.W. Gage Blvd., Topeka, KS 66606 U.S.A.

Membership includes a subscription to Animal Keepers' Forum. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

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# Animal Keepers' Forum

November 1992



*Dedicated to Professional Animal Care*



**Editor-In-Chief:** Susan Chan

**Associate Editors:** Kayla Grams & Gretchen Ziegler

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 S.W. Gage Blvd., Topeka, KS 66606. Ten dollars of each membership fee goes toward the annual publication costs of Animal Keepers' Forum. Third Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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##### Ecosystem Survival Plan

Norm Gershenz, San Francisco Zoo

#### AAZK PUBLICATIONS: CONTINUING DATA COLLECTION

Zoo Infant Development Project - Harmony Frazier-Taylor, Woodland Park Zoo

Diet Notebook, Mammals, Vol. II - Susan Bunn Spencer, Bronx Zoo

An Approach to Zoo Keeping - Patricia Sammarco, Gainesville, FL



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## Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm (6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to Animal Keepers' Forum will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKF. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31.

## DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.

*This month's cover art is of a Victorian Koala (Phascolarctos cincereus victor) at the Los Angeles Zoo. Sometimes called the "native bear", the Koala has no relation to bears but is rather the single genus and species of the Family Phascolarctidae. Adults measure from 60-82cm in height and reach weights to 16kg. They are primarily nocturnal and totally arboreal, making only very rare excursions to the ground. Their diet of approximately 12 species of eucalyptus leaves requires a 1.8-2.5m caecum to aid in digestion of this fibrous food. Although solitary animals, males will set up territories with several females during breeding season. Females are seasonally polyestrous and usually produce one young after a gestation of 35 days. The young spends seven months in the mother's pouch before taking up its life in the trees. This month's artist is Mary Deckert, a Docent at the Los Angeles Zoo. Thanks, Mary!*

## Scoops and Scuttlebutt

### A Note on 1992 Conference Proceedings

Please note that Proceedings from the San Diego National Conference will be published. At press time we did not have all of the papers and workshop abstracts presented from the Conference in hand in order to determine a price for their purchase. Please look for an order form in the December 1992 issue of AKF. This form will include the titles of the manuscripts included, the cost per copy and other ordering information. The cost of proceedings was **not** included in the registration fee, so delegates will also need to order a copy if they wish to have one. Speakers who submitted their copy-ready manuscript for publication in these Proceedings will receive a gratis copy.

### PFC Seeks Committee Members

The Publications Funding Committee is seeking two AAZK members, who may be associate or affiliate members, to assist in the development and implementation of a marketing strategy to seek support for AAZK's various publications (AKF, Diet Notebook, Biological Values, etc.) Interested individuals should submit resume and/or letter of interest to: David Luce, Chair PFC, Chaffee Zoo, 894 W. Belmont, Fresno, CA 93728 or FAX at 209-264-9226. Thanks for your help.

### Environmental Enrichment Conference Planned

The Metro Washington Park Zoo in Portland, OR will host the first conference specifically focused on the subject of environmental enrichment for zoo and aquarium animals. **The Conference is planned for July 16-20, 1993.**

Organized by Drs. David Shepherdson and Jill Mellen, the first two days of the conference will take the form of formal sessions: theoretical papers focused on specific topics, followed by quality case studies representing different taxonomic groups. The subsequent two days will include workshops held at the zoo allowing for free exchange of ideas and information. The workshops will generate recommendations regarding the use of environmental enrichment in the management of captive animals.

The registration fee is \$200 and space is limited. If you are interested in registering for the conference, write to: First Conference on Environmental Enrichment, Metro Washington Park Zoo, 4001 S.W. Canyon Rd., Portland, OR 97221.



### ADT Forms Available Upon Request

Animal Data Transfer Forms for zoos and aquariums are available free of charge upon request. This is a professional service provided by AAZK. Contact: Bernie Feldman, Burnet Park Zoo, 500 Burnet Park Drive, Syracuse, NY 13204. If your facility is not already using the ADT form, please encourage your administration to implement its use whenever an animal is shipped.

### Dreher Park Site for TV Special

Dreher Park Zoo in West Palm Beach, FL was the chosen filming location for Five Star Productions, a local production company out of Boca Raton, FL. With host Ed Beagley, Jr., the company filmed one part of a three-part series of "Today's Environment", for The Discovery Channel. This segment of the series is entitled "Vanishing Wildlife" and focuses on endangered animals, their habitat and what we can do to save both. The actual air date has yet to be announced, but it is due to be sometime in mid-November. *submitted by James D'Amico, Cypress Coast AAZK Chapter Liaison.*

### Understanding Chimpanzees: Diversity and Survival Abstracts Available

Prominent specialists from around the world contributed to the international symposium Understanding Chimpanzees, held in December of 1991 in Chicago. Now a special edition publication of *The Bulletin* of the Chicago Academy of Sciences (Vol. 15/No.1) includes abstracts of all the research papers and numerous video presentations from this conference. The abstracts take a comparative approach to a wide range of topics, including social behavior and ecology, the rich variety of cultural traditions between populations, and the significant cognitive abilities of chimpanzees. Abstracts addressing the survival and well-being of chimpanzees and bonobos examine population status in the wild, threats to habitat and survival, development of sanctuaries, and conservation and care in captivity. The abstracts include observations from field sites across Africa and from zoos and captive colonies. This 56-page document's available for \$4.50. This price includes domestic postage. Overseas air mail, add \$3.00. Overseas surface, add \$1.00. Make check or money order payable to The Chicago Academy of Sciences and send to: Bulletin, The Chicago Academy of Sciences, 2001 N. Clark St., Chicago, IL 60614 USA.

### U.S. Postal Service Issues Exotic Animal Stamps

The U. S. Postal Service on 1 October issued books of stamps featuring exotic animals. These 29-cent first class stamps feature full-color artwork of a Giraffe, Giant Panda, Flamingo, King Penguin and White Bengal Tiger. These stamps are available in books of 20 for \$5.80 each and should be available in your local post office until the first of the year. Even if you are not a stamp collector or enthusiast, these stamps make an attractive accent to your personal correspondence.

### **AAZK Grants Available**

The American Association of Zoo Keepers, Inc. announces the availability of two \$750 research grants in the field of zoo biology. Interested applicants should direct their inquiries to Sue Barnard, Chairperson, AAZK Research/Grants Committee, Zoo Atlanta, Department of Herpetology, 800 Cherokee Ave. S.E., Atlanta, GA 30315. The deadline for submission is 31 March 1992.



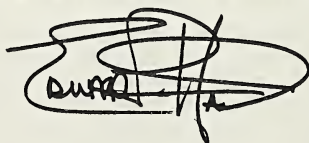
## *From the President....*

Those of us who were fortunate have just returned from the 19th National AAZK Conference held in beautiful San Diego. The hospitality could not have been nicer, the weather more pleasant or the educational opportunities more diverse than the delegates received during their stay. For those of you who could not attend, a short conference committee synopsis was sent to all Chapters during the first part of November. If you are not a Chapter member and would like to receive the summary, as well as the materials sent to Chapters quarterly, please contact me directly and I will place you on this mailing list.

During the first part of the coming year, you will be receiving a short survey in your AKF that will ask you questions regarding your professional status. This survey will help us learn more about the individual make-up of our profession. Also enclosed in the survey will be a section asking your opinions on what you perceive might be the goals of our Association. AAZK has reached a transition period in our history where we can progress forward and make a definitive impact in the field of animal care and conservation. Please take this opportunity to voice your opinion.

If you are an avid reader of AKF, you will notice a change in the front inside cover this month. The AAZK Board has decided to provide the membership with a complete breakdown of what we offer to our membership, stressing membership services. These services are supported by your membership dollars and they are available for you to use either for free or for minimal cost. Please contact the individuals listed for each service to inquire as to the benefits of the services offered.

Ed Hansen, AAZK President  
Reid Park Zoo, Tucson, AZ



## **THE GREENDISK [Yeah!]**

A new paperless environmental journal has just been published on computer disk in MacIntosh and IBM-compatible formats. The GreenDisk is a unique concept in environmental information exchange, providing environmental professionals, journalists, librarians, activists, environmental studies teachers, students, and others with a comprehensive resource documenting the work that is going on within the environmental community. Hundreds of different sources are scanned, ranging from marine mammal protection to toxic waste disposal. The GreenDisk is a forum for the publication of research reports, press releases, action alerts, and news summaries from the world's environmental groups and governmental agencies.

Each issue contains summaries of recently published books, reports, teaching aides, magazines, TV programs and how to obtain them; complete newsletters of some organizations; listings of current employment and volunteer opportunities; and a journal section containing unabridged reports and articles from the scientific community, government agencies, and environmental groups throughout the world. A useful keyword searching program is included with each subscription, so every word of each issue is literally at one's fingertips. A word or phrase is highlighted on the screen, and the results of the search can be printed or saved in a file.

Subscriptions to The GreenDisk are \$35 per year (6 issues). Submissions of research reports, press releases, action alerts, jobs or volunteer opportunity listings, upcoming conferences or events are encouraged. The best way to submit the information is through the electronic networks, or by mailing a disk. The GreenDisk can be reached on EcoNet (greendisk) and CompuServe (70760,2721) and through INTERNET (greendisk@igc.org). To obtain an order form and subscription information, write: The GreenDisk, Box 32224, Washington, DC 20007 USA.

--from the *Smithsonian's Biological Conservation Newsletter* June/July/ August 1992



# Coming Events

## **The AAZPA School for Professional Management Development for Zoo and Aquarium Personnel and Applied Zoo and Aquarium Biology**

February 7-11, 1993

Oglebay Park, W. VA

For further information contact: AAZPA, Oglebay Park, Wheeling, WVA 26003-11698.

## **Northern California Herpetological Society's Sixth Conference on the Captive Propagation and Husbandry of Reptiles and Amphibians**

February 13-15, 1993

Davis, CA

All professional and amateur herpetologists are invited to submit for consideration the titles and abstract of papers they wish to present. Send to: Conference Program Committee, Northern California Herpetological Society, P.O. Box 1363, Davis, CA 95617-1363. For more information contact: Rick Staub (707) 553-9739 or Mark Olin (707) 449-6425.

## **The AAZPA Conservation Academy March 16-20, 1993**

The AAZPA Conservation Academy will offer classes on Studbook I and SSP Coordinator Training. For further information or an application, contact Debra Boyster, AAZPA Conservation Academy, St. Louis Zoo, Forest Park, St. Louis, MO 63110 (314) 781-0900, ext. 297.

## **International Conference on Tortoise & Turtle Conservation**

July 11-17, 1993

New York, NY

Sponsored by the American Museum of Natural History's Turtle Recovery Program and the New York Turtle & Tortoise Society. For further information write to: Craig Vitamenti c/o The New York Turtle Trust & Tortoise Society, 163 Amsterdam Ave., Suite 365, New York, NY 10023 or call (212) 459-4803.

## **14th Association of Avian Veterinarians Conference**

Aug. 31 - Sept. 4, 1993

Nashville, TN

For further information and Paper Criteria, contact: AAV Conference Office, 1625 S. Birch St., Ste. 106, Denver, CO 80222 (303) 756-8380, FAX 303-759-8861.

## **AAZPA 1993 Regional Conferences**

Western Regional Conference (7-9 March, 1993) - for more information contact: Nancy Hollenbeck, Santa Barbara Zoological Gardens, 500 Ninos Dr., Santa Barbara, CA 93103 (805) 962-5339.

Southern Regional Conference (21-23 March 1993) - for more information contact: Fred Antonio or Sandi Tilwick, Central Florida Zoological Park, P.O. Box 470309, Lake Monroe, FL 32747 (407) 323-4450.

Central Regional Conference (4-6 April 1993) - for more information contact: Angela Baier, Sunset Zoological Park, 2333 Oak St., Manhattan, KS 66502 (913) 587-2737.

Great Lakes Regional Conference (18-20 April 1993) - for more information contact: Julene Boe, Lake Superior Zoological Gardens, 7210 Fremont St., Duluth, MN 55807 (218) 624-1502.

Northeastern Regional Conference (2-4 May 1993) - for more information contact: Julia Alarcon-Lorenz, Pittsburgh Zoo, P.O. Box 5250, Pittsburgh, PA 15206 (412) 665-3762.





# Births & Hatchings



**Birmingham Zoological Park (Birmingham, AL)**...reports the following significant B&H for 1992:

**Mammals** - 0.0.2 Cotton top tamarin (*Saguinus oedipus*) [E]; 0.0.4 Pygmy marmoset (*Callithrix pygmaea*) [E].

**Birds** - 0.0.1 Bald eagle (*Haliaeetus leuccephalus*) [E] [1st for our zoo. Released in the wild in Tennessee and is being monitored by radio-tracking device.]; 0.0.1 Bali mynah (*Leucopsar rothchildi*) [E/SSP]; 0.0.1 Chilean flamingo (*Pheonicopterus chilensis*) [1st parent-reared chick at our zoo].

**Reptiles** - 0.0.4 Florida pine snake (*Pituophis melanoleucus mugilus*) [T] [1st for our zoo. Released in the wild by Alabama Department of Conservation.] *submitted by Karen Leichter, Birmingham Zoo AAZK Chapter Liaison*

**Dreher Park Zoo (West Palm Beach, FL)**...reports the following significant B&H from May-Sept. 1992:

**Mammals** - 1.0 Miniature horse (*Equus caballus*) [2nd birth to dam]; 0.0.2 African hedgehog.

**Birds** - 0.0.1 scarlet ibis (*Eudocimus ruber*) [1st time at zoo/DNS]; 0.0.6 Black swan (*Cygnus olor*) [1st time at zoo/ 0.0.5 DNS]; 0.0.2 Black crowned night heron (*Nycticorax nycticorax*) [1st time at zoo].

**Reptiles** - 0.0.41 Melanistic ret rat snake (*Elaphe guttata guttata*) [1st time at zoo]. *submitted by James D'Amico, Chapter Liaison, Cypress Coast AAZK Chapter.*



## AAZK Administrative Offices

**1-800-242-4519 (U.S. Only)**

**1-800-468-1966 (Canada)**

# ATTENTION ALL AAZK MEMBERS

If you were not able to attend the 1992 National Conference in San Diego and are interested in either a Conference T-shirt or Tote Bag, there is still a chance to purchase these items. The T-shirt is ash-colored, pre-shrunk cotton with the 25th Anniversary Conference logo in three colors on the front. The Tote Bag is made of sand-color canvas with handles, and has the three-color conference logo on one side. To order, please fill out the following information and send with check or money order (U.S. funds only) payable to "1992 AAZK Conference" to : San Diego AAZK Chapter, P.O. Box 551, San Diego, CA 92112. Thank you.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_

**COST PER T-SHIRT INCLUDING SHIPPING IS \$13.00**

**COST PER TOTE BAG INCLUDING SHIPPING IS \$5.00**

**T-SHIRT: \$13.00**

**QUANTITY AND SIZE**

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**LARGE: \_\_\_\_\_**

**EXTRA LARGE: \_\_\_\_\_**

**TOTE BAG: \$5.00**

**QUANTITY: \_\_\_\_\_**

**TOTAL: \$ \_\_\_\_\_**



# 1992 American Association of Zoo Keeper Awards

The following awards were presented at the 19th National AAZK Conference held in San Diego, CA from 27 Sept. to 2 Oct. 1992. The Jean C. Hromadka Excellence in Zoo Keeping and Certificate of Merit for Zoo Keeper Education are selected by the AAZK Awards Committee from nominations received from the membership. Janet McCoy, Metro Washington Park Zoo, Portland, OR chaired the Awards Committee this year. The Certificates of Recognition and Appreciation are given by the AAZK Board of Directors. The excellence in Journalism Awards are selected by the editorial staff of *Animal Keepers' Forum*.

## 1992 Jean C. Hromadka Excellence in Zoo Keeping Award Recipient

*In recognition of her professional attitude, true dedication, superb application of animal husbandry practices and contribution to the welfare of the animal life placed in her charge, AAZK presents the following individual with this award*

**Janice Martin, Assiniboine Park Zoo, Winnipeg, Manitoba, Canada**

*Specifically noted were outstanding efforts in husbandry and environmental enrichment of the animals in her care, especially the propagation of *Macaca silenus* and *Hylobates moloch*. Also noted was her work in zoo and local wildlife rehabilitation associations.*

## Certificate of Merit for Zoo Keeper Education Recipient

*In recognition of outstanding support of continuing education and new keeper training, AAZK presents this award to:*

**Zoological Society of San Diego, San Diego, California**

*The Keeper Training Task Force, under the leadership of Diane A. Ledder, Training Administrator, is to be commended on its efforts to continually evaluate and update the program and its goals to improve the quality of animal care, promote consistency, increase communication and reduce keeper illness and injury. These policies and programs lend great support to AAZK's efforts to encourage overall improvement of animal care techniques and procedures. The Association applauds this commitment to excellence in zoo keeping.*

## Certificates of Recognition and Appreciation Recipients

*These awards are given by the AAZK Board of Directors to individuals or groups who have provided volunteer efforts and/or services to the Association. Certificates of Appreciation are to recognize those outside the Association and Certificates of Recognition acknowledge contributions made by AAZK members on Association projects.*

### **Certificate of Appreciation Recipients**

**Chris Peterson, Zoological Society of San Diego**  
*in appreciation for his assistance in corporate sponsorship  
and public relations for the 1992 National Conference*

**Herbie Pearthree, Indianapolis, IN**  
*for his assistance in the computer bookkeeping aspects of the  
1992 Bowling for Rhinos fundraiser*

**Zoological Society of San Diego, San Diego, CA**  
*for their underwriting assistance in the publication  
of AAZK's 25th Anniversary History Book*



## **1992 AAZK Awards, Continued**

**Woodland Park Zoological Gardens, Seattle, WA**

*for their assistance in and support of  
the Zoo Infant Development Project*

**Topeka Zoological Park, Topeka, KS**

*in sincere appreciation for providing office space for  
the AAZK Administrative Offices and editorial offices  
for Animal Keepers' Forum*

### **Certificate of Recognition Recipients**

**Elandra Aum, Woodland Park Zoological Gardens, Seattle, WA**

*for her work on the Manual of Resources*

**Bob Debets, Assiniboine Park Zoo, Winnipeg, Manitoba, Canada**

*for serving as chair of the Conservation, Preservation and Restoration Committee*

**Mark de Denus, Assiniboine Park Zoo, Winnipeg, Manitoba, Canada**

*for serving as chair of the Exhibit Design Project*

**Rachel Rogers, San Diego Zoo, San Diego, CA**

*for serving as Chair of the History Committee and author of the  
25th Anniversary History Book*

**Kevin Conway, Front Royal Conservation & Research Center, Front Royal, VA**

*for service on the AAZK By-laws Committee*

**Tim Kurkowski, Zoo Atlanta, Atlanta, GA**

*for service as the AAZK Public Relations Liaison*

**John Stoddard, Chicago, IL**

*for service as the AAZK Legislative Advisor to AKF*

**Brint Spencer, Beardsley Zoo, Bridgeport, CT**

*for service as AAZK Liaison to AAZPA*

**David Luce, Chaffee Zoological Gardens of Fresno, CA**

*for service as Nominations & Elections Chairman*

**Patty Pearthree, Indianapolis Zoo, Indianapolis, IN**

*for service as the 1991 Bowling for Rhinos Coordinator*

**Ellen Bradfield, Zoo Atlanta, Atlanta, GA**

*for service as the Chair of the Public Education Committee*

**Toni Danzig, San Francisco, CA**

*for serving as Editor of Biological Values for Selected Mammals III*

**Greater San Francisco Bay Area AAZK Chapter**

*for their work researching Biological Values for Selected Mammals III*

**Terri Peterson, Guy Lichty and Steve Castillo**

*for their extraordinary efforts in serving as Co-Chairs of the  
1992 AAZK National Conference celebrating the 25th  
Anniversary of the Association*

**Distinguished Service Award Plaques**

*were presented to the following institutions that make up  
the San Diego AAZK Chapter - Host for the 1992 Annual Conference*

**San Diego Zoo  
San Diego Wild Animal Park  
Sea World of San Diego**

---

**Excellence in Journalism Awards**

Outstanding Article: "Evaluating Reproductive Status in the  
Female Dromedary Camel (*Camelus dromedarius*)"  
**Wendy Marshall, Erie Zoological Society, Erie, PA**

Outstanding Article: "Safe Spots, Safe Places and  
Behavior Consistent Routines"  
**James Bousquet, Walk in the Wild Zoo, Spokane, WA**

Outstanding Article: "Sustaining Captive Primate 'Natural'  
Behavior Via Psychological Enrichment"  
**Bruce Clark, Toledo Zoological Gardens, Toledo, OH**

Outstanding Cover Art: Bornean Orangutan  
Published in February 1992  
**Geoff Creswell, Topeka, KS**

Honorable Mention Article: "Breeding the Writhe-Billed Hornbill  
(*Aceros l. leucocephalus*) at Miami Metro Zoo"  
**Dolora Jung, Miami Metro Zoo, Miami, FL**

Honorable Mention Article: "Exhibiting Mudskippers at  
the Burnet Park Zoo"  
**Nancy K. Porter, Burnet Park Zoo, Syracuse, NY**

Honorable Mention Article: "Treating Periodontal Disease in  
the Lesser Bushbaby (*Galago senegalensis*)"  
**Ruby L. Ange and Dr. M.K. Izard  
Duke University Primate Center, Durham, NC**

Honorable Mention Article: "*Malacochersus tornieri* - the  
Pancake Tortoise and Its Eggs"  
**Ronnie E. Hatcher, Columbus Zoological Gardens, Columbus, OH**





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# Hurricane Andrew Update....

**From James D'Amico, Chapter Liaison/Secretary Cypress Coast AAZK Chapter**

A truly heartfelt thank-you goes out to all chapters and individuals who have sent money and materials to Dreher Park Zoo, West Palm Beach, FL, to help out the keepers and zoos devastated by Hurricane Andrew. Well, the outpouring has been great from many. An extra special thanks goes out to the Little Rock Chapter and the Central Florida Chapter. Both contributed greatly and were most appreciated by Miami Metro Zoo and Monkey Jungle staffers.

At this time the list of items needed is basic, but essential....

- Chainsaws and extra chains
- Gas / Oil (2 part), Bar Oil
- Axes, Saws and Machetes
- Generators, Gas, Extension Cords
- Pumps for draining pools
- 4x4x8 lumber (approximately 200)
- Packages of socks and underwear
- Horse Chow (for keepers' private animals)
- And, of course, money

Please send any of the above to Dreher Park Zoo. Members of the Cypress Coast AAZK Chapter will then deliver them to Dade County. Any money received will be used to purchase locally those items needed which will then be sent on to Dade.

**From Rick Smith, AAZK Regional Coordinator for Florida**

Rick has notified our office that if anyone is going to be in the Miami area and would like to help out with rebuilding efforts at Monkey Jungle, their help would be greatly appreciated. Help is needed repairing walkways, etc. throughout the facility. Housing is available for volunteers. If anyone is interested they may contact Jill Dechello at (305) 985-7272.

**Some rays of hope...**

Genni a seven-year-old Siamang from Monkey Jungle and her mate George, 22, had to be relocated to Lion Country Safari in West Palm Beach following the hurricane. Genni was pregnant and there was concern for her well-being. However, on 14 September, Genni delivered an apparently healthy baby (as yet unsexed).

At Miami Metro Zoo, Hope, a female Reticulated giraffe, was born on Labor Day amid the storm's devastating aftermath. Also born at the facility have been two Colobus monkeys, two Nyala antelope and a Yellow-backed duiker found by zoo staff in a moat following the storm.

Chapters or individuals wishing to send money for hurricane relief are asked to channel their efforts through The Zoo Crisis Fund, AAZPA, 7970-D Old Georgetown Rd., Bethesda, MD 20814.



# Still hanging on!



## MIAMI METRO ZOO

## "Hurricane Andrew"

August 24, 1992

On behalf of the keepers at Miami Metro Zoo, I would like to thank everyone who has helped us in our efforts to survive Hurricane Andrew's aftermath and begin the process of rebuilding. Many goods have been received and much help offered. For these things we thank you very much, and because of your generous support, we ARE rebuilding!

One of our keepers (Antonio Flores) has designed a T-shirt illustrating this. We would like to offer these to you for \$12.00 each which includes postage. All profits will go to a fund to help the keepers who suffered personal losses from Hurricane Andrew. Whenever possible, please order as a whole Chapter or Zoo. This would save us a great deal of confusion (we have a lot of that down here already!). Thanks again! We're still hanging on!

**Sincerely,**

**Barbara Palmer**

**Primate Keeper Miami Metro Zoo**

Hurricane Andrew T-shirts are available in Medium and X-Large sizes only. Color choices are: Coral, Green, Yellow, Grey and Blue. Checks or Money Orders should be made payable to "Keeper Relief" (U.S. Funds ONLY). Send orders to: Walter Dupree, c/o Miami Metro Zoo, 12400 S.W. 152nd St., Miami, FL 33177. Be sure to include: (1) total number of shirts in your order, (2) color and size choice for each shirt ordered, (3) your complete mailing address, (4) check or money order. **ORDERS WILL BE TAKEN UNTIL 15 JANUARY 1993.**

# ZIDP

ZOO INFANT DEVELOPMENT PROJECT



**AAZK**

AMERICAN ASSOCIATION OF ZOOKEEPERS

## DID YOU MISS THE ZIDP LAST MONTH ?

A great number of you didn't! In fact, response over the last two months has been great!

All the people listed below sent in their piece of information to the ZIDP.

I will accept data forms and weights until 1 January 1993.

If you work outside of the U. S. and Canada, I will accept information until 1 April 1993.

## Thanks to the following people:

Ed Hansen - Giant Anteater, Grevy's Zebra; \*Larry Sammarco - Sumatran Tiger; \*Virginia Stamos - White-tailed Deer, Pot-bellied Pig, Bison; \* Mary Alspach - Indian Muntjac, Reeves Muntjac; Ann Stevens - Titi Monkey, Black & White Colobus; \*D. Safranck - Mandrill, Ring-tailed Lemur; \*Lee Ann Rottman - Fat-tailed Dwarf Lemur; \*Kelly Webb Fad - Bornean Orangutan; \*E. Bains - Angolan Colobus; Tina Coleman - White-bellied hedgehog; Jo Roach - Patas Monkey; Neil Dretzka - Siberian Tiger, Snow Leopard; Cynthia Bickel - Amur Leopard; Chris Bobko - Hippopotamus; Diane Hagey - Reticulated Giraffe; Debra McGuire - Bornean Orangutan, DeBrazza Monkey, Black Howler Monkey, Spider Monkey; Beth Schwenk - Rodriguez Fruit Bat, Matschie's Treerose; Maria MacManus, Collared Lemur; Jan Outlaw - Snow Leopard, North American Porcupine; P.J. Hawthorne - Cape Buffalo; Pam Talbot - Slow Loris (From Woodland Park No. Records) & Straw Colored Fruit Bat, Steamed Tenrec; Deborah Freed - Reeve's Muntjac; Fawn Prevost - Mexican Porcupine; and David Bocian - Hamlyn's Guenon.

## AND THESE INDIVIDUALS WHO SENT IN WEIGHT DATA !

Michelle Frahm, DVM, Gladys Porter Zoo; Kelly Wilmoth, LVT, Houston Zoo; Virginia Crossett, LVT, Louisville Zoo; Stacey Johnson, ZooWorld, Panama; Heather Lewis, Wildlife Safari; T. Petit, DVM, Zoo La Palmyre, France; Ros Wilkins, Western Plains Zoo, Australia; Bonnie Breitbeil, Central Florida Zoo; Cheryl Purnell, LVT, Detroit Zoo; Sean M. Connell, Audubon Zoo; Joan Ryskamp, John Ball Zoo; Joel Pond, LVT, Lincoln Park Zoo; Paul R. Reillo, PhD, Rare Species Conservatory, FL; Ron Kastelein, PhD, Zeedierenpark Harderwijk, Holland; Conrad Ensenat, DVM, Parc Zoologico De Barcelona; Willem Schaftenaar, DVM, Rotterdam Zoo; Ana Lucia Fonseca Rodriguez, University of Sao Paulo, Brasil; Linda Leppert, CVT, Oklahoma City Zoo; and Jens Lilleor, Aalborg Zoo, Denmark.

Also weight data from: Noorder Dierenpark Zoo, Holland; Reid Park Zoo, Tucson, AZ; and Sunset Zoological Park, Manhattan, KS.

**IT'S GOING TO BE BIG ! DON'T YOU WANT TO BE PART OF IT ? SEND YOU PIECE OF THE MIGHTY BIG PUZZLE NOW !**

And thank you for all the interest at the National AAZK Conference in San Diego. I'll be looking for all the data I was promised.....

Harmony Frazier Taylor  
ZIDP Coordinator, Mammals  
Woodland Park Zoo  
5500 Phinney Ave. N.  
Seattle, WA 98103

\*All Lowry Park Zoo in Hurricane-hit Florida, and they still sent info!



# 1992 Bowling for Rhinos Report to the Members



*submitted by Patty Pearthree, BFR Coordinator  
Indianapolis Zoo, Indianapolis, IN*

The 1992 "Bowling for Rhinos" fundraiser earned about \$102,000.00. A handful of Chapters have not as yet sent in their money so we are still waiting for exact totals. If you receive additional checks, please send them to me ASAP. I will add them to this year's total and adjust financial forms until **December 1st**. After this date, all additional checks will go towards our 1993 totals.

Cara Lance from Indianapolis with \$4,976.50 and Debbie Palay from Lincoln Park with \$1,743.00 are the winners of the two-week trip to visit the Ngare Sergoi Rhino Sanctuary in Kenya. Patty Pearthree (Indianapolis), Angie Chader (Kansas City), Tim Brooks (Metro Washington Park), Raymond Figueroa (San Antonio), Katrina Donnelly (Suncoast Chapter), Scott Woodward (San Diego), and Cate Werner (Rocky Mt. Chapter) each win a bowling ball or bag from Brunswick Corporation as high money raisers.

To win the Sanctuary trip, you must be a National AAZK member in good standing at the time of your event. Please be sure that all participants are informed of this because this was not made clear last year.

If you would like copies of any of the following, please call me at (317) 322-8723 or write B.F.R., P.O. Box 199026, Indianapolis, IN 46219:

1. Bowling for Rhinos Workshop Paper
2. Sample Personal Donation Letter (sent to friends and family)
3. Bowling for Rhinos flier to advertise the event
4. Ngare Sergoi Trip Letter
5. Sample registration ticket
6. Sample Corporate Sponsor Letter
7. Sample Rules Sheet (to give to bowlers)
8. Sample Celebrity Letter
9. Blank Financial Statements
10. Sample Prize Request Letter
11. Sample 8 x 10 Rhino picture that can be made into posters or T-shirts

If you are bowling in March or April of '93, you should begin to get a bowling alley and set the date for your event ASAP!

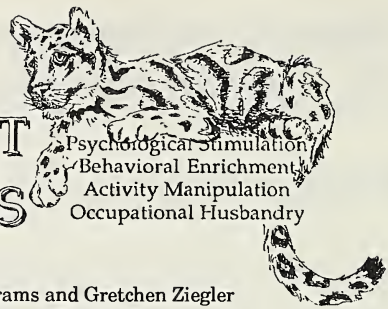


**AAZK's New FAX Number IS**

**913-273-1980**



# ENRICHMENT OPTIONS



Psychological Stimulation  
Behavioral Enrichment  
Activity Manipulation  
Occupational Husbandry

by Kayla Grams and Gretchen Ziegler  
Keepers, Topeka Zoo

We would like to thank everyone who has submitted to this column both past and present. We received a number of items at the Conference and so should be able to fill this space for awhile. The Enrichment Workshop held in San Diego was a huge success and we thank all who contributed with ideas and videotapes. It would be great if we could make such a workshop an annual Conference event. A synopsis of the workshop will be published in the Conference Proceedings due out early next year. Watch AKE for details.

**PRIMATES** - provide a sandbox at least as deep as the length of your primate's arm. Ours is portable, so it can be taken in and out of the exhibit. For Capuchins, it contains 200 pounds of sand, thereby being too heavy to dump. In the sand hide nuts, toys, the one-foot shoots of running bamboo, or paper bags or boxes with treats inside.



This drawing shows a White-faced Capuchin (*Cebus albifrons*) engaged in sand play. Many types of primates (including Capuchins, Guenons and Squirrel monkeys) will fish in shallow (arm depth) water for small feeder goldfish.

--Camille Dorian  
Monkey Zoo, Orinda, CA

**QUAIL AND OTHER DUST-BATHING BIRDS** - the provision of a container of fresh soil is greatly appreciated by dust-bathing species, especially those kept on concrete, or wire in holding cages suspended or positioned on grass (when first provided the birds pack into the container so tightly, it resembles a commuter train in Tokyo). In exhibits, an area of loose soil can be strategically dug for species such as American Rhea to dust-bathe right in front of the visitors.

--Ken de la Motte  
Project Planning Officer  
Taronga Zoo, Australia



# Boomer Ball®

## Toys for the Animals

### Second Annual Christmas Contest

Boomer Ball® challenges your rare species to try our products! Before December 15, 1992, submit a valid purchase order for Boomer Balls, Jungle Balls, Challengers, Bobbins, Polar N'Ice Cubes or Pigg'ns. Then capture your rare and unusual animals in color or black and white **ACTIVELY** playing with their product of choice. Submit the pictures before January 30, 1993. If your animal is among the 50 individual animal winners, a free duplicate of the product purchased will be sent to you by Boomer Ball. All pictures will become the property of Boomer Ball, and may be used in future advertising at trade shows, in printed advertisements, or in other media, with the clear statement that use by that individual animal does not necessarily imply endorsement of the product by the institution or facility which owns the animal. Names of institutions will not be used without specific permission.

#### Contest Rules:

1. Offer limited to 6 individual animal entries per institution or facility--the more unusual the animal, the better chance of winning.
2. Photographs for entry must be received by Boomer Ball before January 31, 1993.
3. 50 individual animal winners will be chosen, and the winning institutions will be advised by February 20, 1993. (Group pictures will count as a single entry.)
4. A list of winning animals will be published in the March 1992 issues of the *Animal Keepers's Forum* and *Animal Finder's Guide*.
5. Each photograph entered must have attached the following information:
  - a. species
  - b. name of the animal
  - c. name and title of person submitting entry
  - d. name of institution or private facility owning the animals and the address
  - e. permission or prohibition for use of the institution name to identify the animal in future Boomer Ball advertising.
  - f. brief description of style of play used by your animal, and any special tricks or innovations introduced by the animal.
  - g. brief description of reason for introducing the toy to this particular animal (increase activity, alleviate boredom, inspire group interaction, etc.)

LIONS TIGERS BEARS MONKEYS GORILLAS PIGS CHIMPANZEES OTTERS

WOLVES HIPPOS GOATS ELEPHANTS TAPIRS ANTEATERS RHINOS DEER

MINIATURE DONKEYS FERRETS LEOPARDS DOLPHINS PARROTS FOXES

SEALS SEA LIONS WALRUS OR ANY OTHER SPECIES THAT ENJOY PLAYING

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24171 W. Rt. 120  
Grayslake, IL 60030



**QUESTIONS? Call (708) 546-6125 (If we're not there, leave your name and number and we'll call back)**



# Conference Attendance Support Survey

The Little Rock Chapter of AAZK is exploring how to provide better and more equitable support for our keepers to attend conferences. Our discussions have led to a desire to find out what types of assistance other zoos offer. Hence this survey. The questions were developed in a manner to make them as easy as possible to answer. If your situation falls between the choices, please comment! Please answer them in relation to all conferences, not just AAZK. If there is any discrepancy in how different conferences are handled, please note. If you are willing to be contacted to provide more information or clarify details, please let us know. Please photocopy these two pages and return completed surveys to: Little Rock Chapter AAZK, #1 Jonesboro Drive, Little Rock, AR 72205.

Zoo/Facility:\_\_\_\_\_

Name:\_\_\_\_\_

Address:\_\_\_\_\_

Phone and best time to contact you:\_\_\_\_\_

1. What type of leave are keepers required to take for conferences?

Unpaid vacation

Paid vacation

Unpaid conference time

Paid conference time

Other

2. Are you limited to a certain number of conferences per year? YES NO How Many\_\_\_?

What other limitations in time apply? (i.e. can attend only conferences specific to your work area; limited to total number of days per year, etc.) \_\_\_\_\_

\_\_\_\_\_

3. Are you provided with monetary support from your zoo? YES NO

If YES, what are the restrictions/qualifications? Set amount per keeper/staff member.

\_\_\_\_\_

4. What other types of assistance does your zoo provide? (use of equipment, vehicles, etc.)

\_\_\_\_\_

5. Are you provided with monetary support from your Society/Foundation? YES NO

If YES, what are the restrictions/qualifications? Set amount per keeper/staff member, percentage of expenses, registration only, others:\_\_\_\_\_

\_\_\_\_\_

6. Are you provided with other types of assistance from your Society/Foundation?\_\_\_\_\_

\_\_\_\_\_

7. If you are an AAZK Chapter member, what type of monetary assistance does your Chapter provide?

Not a Chapter member    None    Set amount per member    Percentage of expenses  
Registration only    Others/restrictions

8. Are you provided with other assistance from your Chapter? Please explain

9. Is conference assistance available from the Chapter to non-chapter members? YES    NO

Please explain: \_\_\_\_\_  
\_\_\_\_\_

10. If your Chapter provides monetary assistance, where do the funds come from?

General Fund    Specific Fundraisers    Income from Regular Source

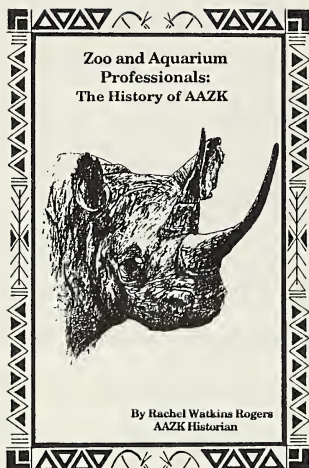
Please provide as much detail as possible: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In the interest of time, please be as brief & thorough as possible on the following questions.

11. Do you feel there are any circumstances which make your zoo's/society's/chapter's situation unique? (i.e. large bequest specifically to provide assistance, director highly motivated to encourage conference attendance, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. How do you feel your zoo's/society's/chapter's method of providing assistance works? Is the method of determining who gets how much assistance equitable? Do you feel more or less assistance could or should be provided? What changes would you make if you could?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**THANK YOU FOR YOUR HELP!**  
**Please Return Surveys by 31 January 1993**



## Zoo and Aquarium Professionals: the History of AAZK

AAZK is pleased to announce the availability of Zoo and Aquarium Professionals: the History of AAZK. This 216-page volume chronicles the history of the American Association of Zoo Keepers from its beginnings at the San Diego Zoo in 1967. Included in the book is the early evolution of the Association, its projects, programs and committees, the histories of its 70

plus chapters, and its highly successful conservation programs - "Bowling for Rhinos" and the Ecosystem Survival Plan's Conservation Parking Meters.

AAZK is proud of the progress it has made in the past 25 years in the promotion of professionalism among zoo keepers and is pleased to share this growth through the pages of Zoo and Aquarium Professionals: the History of AAZK.

The book may be ordered by completing the form below and returning it to: AAZK History Book, AAZK Administrative Offices, 635 S.W. Gage Blvd., Topeka, KS 66606. Make checks or money orders payable to "AAZK, Inc."

### AAZK History Book Order Form

Please send \_\_\_\_\_ copy(ies) of the AAZK History Book to:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

**PRICES:** AAZK Member: \$10.00

Non-Member: \$15.00

Note: Orders outside the U.S. add \$3.00 per copy for postage.

**TOTAL Enclosed \$ \_\_\_\_\_ (U.S. Funds ONLY, Please)**



# **ELECTION.....'93**

**WE WANT YOU!** Do you wish to help your professional organization? Become an AAZK Board Member. Two seats are up for election - those held by Ed Hansen and Janet McCoy, whose terms expire on 31 December 1993. New board members will serve a four-year term from 1 January 1994 through 31 December 1997. Why is this first call for nominations so early? **TIME** is the answer. Nominations, candidates verification and tallying mailed ballots require time. We also wish to notify winners early enough to allow them to make arrangements to attend the National AAZK Conference **before** they assume office the following January. This will enable the new Board Members to become familiar with Board responsibilities and AAZK activities before they assume responsibility for our organization.

## **Duties of the Board of Directors**

For a more detailed explanation of the expanded duties of the Board, refer to the By-Laws (available upon request from Administrative Offices in Topeka, KS).

- 1) Select, appoint or remove officers, committees, agents and employees of the Association, including prescribing powers and duties.
- 2) To control and manage the Association and its property, passing upon acquisition and disbursements with approval of a majority of the Board.
- 3) To formulate policies, rules and regulations in accord with the Constitution & By-Laws.
- 4) To uphold the Constitution of AAZK and the policies of the Association.
- 5) To appear at Board meetings, to accept Board assignments and to devote the time to communications pertinent to all Board business, including answering correspondence promptly and efficiently.

## **Qualifications for Nomination**

- 1) Nominee must be a Professional Member of AAZK and must have been a member of the Association for at least one year.
- 2) Nominee must be presently employed as an animal keeper/attendant by a recognized zoological institution or aquarium in the U.S. or Canada and must have been in the zoological field for at least two years.

## **Nomination Procedure**

- 1) Nominator Form:
  - a. List the name of the nominee, phone, address, and institution.
  - b) State in 150 words or less the reason(s) why the nominee warrants election to the Board of Directors.
  - c) Nominator signs forms and mails to NEC Chairperson.
  - d) Notifies nominee that they nominated him/her for the Board.
- 2) Nominee Biographical Form:
  - a) Professional background: places of employment, length of service, titles.
  - b) Membership in AAZK: National and local chapters, number of years, offices held, involvement in activities.
  - c) Educational background.
  - d) Membership in Affiliate Organizations: (AAZPA, Audubon, etc.)
  - e) State in 500 words or less why you would like to be on the BOD and any other pertinent information. (optional)
  - f) References (one or two)
  - g) Nominee signs forms and mails to NEC Chairperson.

**NOTE:** Candidate is ineligible for nomination if **both** the nominator and nominee biographical **forms** are not **complete** and **returned** to the NEC Chairperson **by 31 January 1993**. Send completed forms to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.

# **Nomination Form for** **AAZK Board of Directors**

## **Qualifications for Nomination:**

- 1) Nominee must be a Professional Member of AAZK and must have been a member of the Association for at least one year.
- 2) Nominee must be presently employed as an animal keeper/attendant by a recognized zoological institution or aquarium in the U.S. or Canada and must have been in the zoological field for at least two years.

1. Name of Nominee: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Institution: \_\_\_\_\_

Director: \_\_\_\_\_

2. State in 150 words or less the reason(s) why the nominee warrants election to the AAZK Board of Directors.

3. Signature of Nominator: \_\_\_\_\_

4. Form must be received by the NEC Chairperson by 31 January 1993.  
Send to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.

**Nominee Biographical Form**  
**for AAZK Board of Directors**

(To be completed by Nominee)

1. Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

**PLEASE LIST THE FOLLOWING INFORMATION**

2. Professional Background: (places of employment, length of service, titles)

3. Membership in AAZK:

a) National: number of years \_\_\_\_\_

Activities:

b) Local Chapter(s): number of years, offices held, involvement in activities.



**4. Educational Background:**

**5. Memberships in Affiliate Organizations: (AAZPA, Audubon, WWF, etc.)**

**6. State in 500 words or less why you would like to be on the BOD and any other pertinent information. (optional)**

**7. References (one or two): gave name, address and phone number where they can be reached:**

**8. Nominee's Signature:\_\_\_\_\_**

**9. Form must be received by NEC Chair by 31 January 1993. Send form to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.**

# Correlation of Testicular Size to Fecal Steroid Concentrations in the Black-footed Ferret

By

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## Abstract

The Black-footed ferret (*Mustela nigripes*) is an endangered North American mustelid (Seal et al., 1989). Black-footed ferrets are seasonal breeders and the male exhibits testicular recrudescence during the breeding season (Nalbandov, 1976). A non-invasive method to chart testosterone levels and correlate testicular size in the male ferret would improve the understanding of their reproductive behavior. Such techniques would be less stressful for the animal than traditional sampling methods and can be used in the field once the ferret is reintroduced to the wild. Six male Black-footed ferrets ranging from one to two years of age were measured on a weekly basis and fecals collected. Fecal samples were solubilized and extracted prior to analysis for testosterone using a competitive binding assay (radioimmunoassay: RIA). Fecal testosterone concentrations correlated ( $R^2 = 0.8432$ ) with testicular size; both increasing during February and March. High fecal testosterone concentrations ( $8.4 \pm 1.5$  ng/0.5 g feces) were observed from late March through early May, when testicular size was maximized and when breeding behaviors were observed. Fecal testosterone concentrations ( $R^2=0.6988$ ) decreased during mid to late May for each male prior to any significant decrease in testicular size ( $R^2=0.8714$ ). Breeding behaviors and breeding success decreased when fecal testosterone concentrations were significantly lower. This data indicates that a non-invasive method for measurement of testosterone in Black-footed ferrets is possible. These methods offer the opportunity for monitoring reproductive potential in male Black-footed ferrets by a non-invasive measurement of fecal testosterone concentrations.

## Introduction

The Black-footed ferret was thought to be extinct until rediscovery in 1981 near Meeteetse, Wyoming. The population of Black-footed ferrets is growing through captive propagation. Black-footed ferrets are mostly nocturnal, solitary carnivores that live in the burrows of Prairie dogs (*Cynomys ludovicianus*). They prey mainly on prairie dogs, although ground squirrels, mice and other small mammals supplement their diet. Habitat destruction and principle prey depletion were the main factors in the species decline (Seal et al., 1989). Since rediscovery of a colony in 1981, their numbers peaked to approximately 129 free-ranging animals by 1985. In 1985, an outbreak of canine distemper devastated the population. By 1986, numbers were down to approximately 18 individuals. A decision was made in the Fall of 1986 to capture all remaining Black-footed ferrets because of the threat of extinction. Eighteen were captured (7.11). Since their capture, no confirmed sightings have been reported (Seal et al., 1989).

Since 1986, Black-footed ferrets have been housed at the Wyoming Wildlife Research and Conservation Education Center in Sybille, WY. Captive breeding success resulted in a total population of 58 ferrets as of July, 1988. This success initiated a decision to break up the colony to prevent a catastrophic loss from an outbreak of disease or other disaster. On 15 December, 1988, Omaha's Henry Doorly Zoo received 4.4 Black-footed ferrets from Sybille, WY (Thorne, 1988). Reproductive success in captivity is essential for this species to survive. Since 1988, captive breeding efforts have increased the captive population to approximately 350 individuals.

## **Correlation of Testicular Size to Fecal Steroid Concentrations in Black-footed Ferrets, *Continued***

Little is known about the reproduction of the Black-footed ferret. Most data collected and adapted to the Black-footed ferret is from domestic ferrets (*Mustela putorius furo*) or Siberian polecats (*Mustela altaica*). Most methods used on domestic ferrets are invasive procedures (i.e. blood collection). At the Wyoming Fish and Game Department, urinary steroid analyses were attempted on the Black-footed ferret, but were unsuccessful (Thorne et al., 1989 unpublished data). From studies conducted at the Omaha Zoo, feces can be successfully analyzed for steroid metabolites. (Gross et al., 1990; Wieser et al., 1991; and Gross et al., 1992). The purpose of this research is to correlate testicular size with fecal testosterone concentrations in the male Black-footed ferret and to correlate these measurements with sexual behaviors exhibited during the breeding season. Any and all data that can be collected and analyzed on this species will aid in successful propagation and the ultimate reintroduction of the Black-footed ferret to the wild.

### **Materials and Methods**

Black-footed ferrets are seasonal breeders. The male ferret exhibits testicular recrudescence (see key terms) each breeding season (Nalbandov, 1976). Hormonal measurements in feces could be a precise method to monitor male ferrets throughout their breeding season. Ultimately, analyses for fecal steroids could be used on a routine basis to evaluate the seasonal variations in testosterone concentrations relative to optimal breeding success. To attain this goal, determination of the metabolism and excretion of steroids is needed and valid assay procedures need to be developed to measure androgen metabolites in the feces of the male Black-footed ferret.

The Black-footed ferret facility at the Omaha Zoo is managed as a quarantine facility to protect the animals from the two main disease threats, canine distemper and human influenza (Wieser, 1990). All the animals are housed in one large room under artificial (Vita-light®) light. The lights are on a timer that simulates the natural photo period (Central Time). Males and females are housed in separate cages and paired together only a few days a year when the female is in estrus.

Black-footed ferrets are seasonally monoestrous (one estrous cycle during each year) (Seal et al., 1989) and their breeding season occurs in the Spring. Black-footed ferrets are induced ovulators (Seal et al., 1989). In early Spring, males and females begin to exhibit sexual development. The females exhibit vulvar swelling and the onset of estrus is monitored through vaginal flushes by examining vaginal epithelial cytology (Williams et al., 1992). The males begin to show an increase in testicular development as the breeding season approaches and the testicles begin to enlarge. Testicular measurements were taken and recorded on six male ferrets starting in February, 1990, and ending in June, 1990. The length of each testicle and its firmness were measured once a week. At this time, fecal samples were also collected and stored at -20° C until analyzed. The sample group included three animals that were two years of age and three that were one year old.

Half gram samples of fecal material were placed in a test tube with 10ml citrate buffer (Ph 5.0) to solubilize each sample. Each sample was agitated for 45 minutes to help solubilize then centrifuged (1100 x g) for 15 minutes. A one ml aliquot of the supernatant was taken from each tube to be extracted. Five mls of anhydrous ether is added to each sample, vortexed for one minute and snap frozen in a dry ice/methanol bath. The organic phase was poured off and dried in a 45° C water bath (this is done to rid the sample of organic solvents). This procedure is repeated to fully extract the sample and maximize recovery. This extraction method proved to be adequate for extracting fecal testosterone (>90% efficiency) for analysis in an assay (Gross et al., 1992).

Commercially available radioimmunoassay kits (I125 Testosterone; ICN Biomedical INC) were used for these analyses. These procedures were validated for serial dilutions (varied masses) of feces as well as for the detection of known quantities of exogenous testosterone added to pooled fecal samples. These validation procedures indicated an assay (RIA) procedure which was useful for the quantification of testosterone in feces from Black-footed ferrets.



## Correlation of Testicular Size to Fecal Steroid Concentrations in Black-footed Ferrets. *Continued*

### Results

Overall, for the six male Black-footed ferrets in this study, fecal testosterone concentrations correlated ( $R^2=0.8432$ ) with testicular size, both increasing during February and March. Early in the male Black-footed ferret breeding season (early February) testicular length averaged  $4 \pm 2.4$  mm and fecal testosterone concentrations were low ( $0.7 \pm 0.2$  ng/0.5g feces). Fecal testosterone concentrations increased throughout February and March along with steady increases in testicular length. High fecal testosterone concentrations ( $8.4 \pm 1.5$  ng/0.5g feces) were observed from late March through early May, when testicular size was maximized (mean length,  $14 \pm 3.5$ mm) and when breeding behaviors were observed. Fecal testosterone concentrations decreased during mid to late May for each male (mean concentration,  $5.8 \pm 0.9$  ng/0.5g feces) prior to any significant decrease in testicular size ( $R^2=0.8714$ ) and fecal testosterone concentration ( $R^2=0.6988$ ). Breeding behaviors and success decreased when fecal testosterone concentrations were significantly decreased.



This male Black-footed ferret (*Mustela nigripes*) is one of the breeding group housed in special quarantine facilities at Omaha's Henry Doorly Zoo, Omaha, NE. This animal was one of those born to the 18 (7.11) animals taken into captivity after canine distemper effectively destroyed the rest of the wild population. Captive breeding efforts have now allowed the Black-footed ferret population to rise to approximately 350 animals and reintroduction efforts into wild habitat are underway.

## **Correlation of Testicular Size to Fecal Steroid Concentrations in Black-footed Ferrets.** *Continued*

Of the six males used in this study, two were successful breeders during the 1990 season. Males 36, 52 and 60 (studbook numbers) were two years of age at the time of the study. Males 101, 157 and 121 (studbook numbers) were one year old. Male 36 was paired with three females one of which produced offspring. This male was at his maximum testicle size during both unsuccessful pairings. His testicles were decreasing in size at the time of successful breeding with the third female. Fecal testosterone concentrations were also decreased ( $6.1 \pm 0.5$  ng/g feces) at the time of this successful breeding. Male 52 was paired with two females and produced offspring with both pairings. This male was at his maximum in testicle size (15mm) at the time of both pairings. Sperm was found on the vaginal flush performed on one of these females the morning after they were paired. Fecal testosterone concentrations were high ( $8.5 \pm 0.7$  ng/0.5 g feces) during these pairings. Male 101 was never paired with a female during the 1990 season. However, this male exhibited similar changes in testicular length and fecal testosterone concentration as described for the overall population. Male 157 was paired with one female and good breeding activity was observed. Sperm was found in the morning flush but no offspring were produced. His testicular size was decreasing (12mm) by the time he was paired with this female and fecal testosterone concentrations were also decreasing ( $5.4 \pm 1.0$  ng/0.5 g feces). Results for male 60 were very similar to those indicated for male 157. He did not produce offspring although sperm was found on the vaginal flush. This male was at maximum testicle size at the time of mating and fecal testosterone concentrations were high ( $8.7 \pm 1.2$  ng/0.5 g feces). Male 121 was paired with one female and showed good breeding behavior but produced no offspring. He was at his maximum testicle size at the time of mating and fecal testosterone concentrations were appropriately high ( $7.9 \pm 0.6$  ng/0.5 g feces).

### **Discussion and Conclusions**

Black-footed ferrets and domestic ferrets (*Mustela putorius furo*) are similar in many ways. However, there are some reproductive differences. The domestic male ferrets has a longer breeding season to accommodate the fact that females are polyestrous (multiple estrous cycles during each year) (Seal et al., 1989). Female Black-footed ferrets are monoestrous with estrus occurring in the spring. Male Black-footed ferrets have a short breeding season usually lasting from April until June.

Results indicate that a significant decrease in testicular size (mean length,  $7 \pm 2.5$ mm) and fecal testosterone concentrations is needed before breeding behaviors and breeding success are no longer observed.

The use of fecal steroid analysis to determine peak testosterone levels and optimum breeding opportunities in the Black-footed ferret could increase reproductive success in this species. Charting peak testosterone levels in the male ferrets could be utilized to produce pairings at optimum periods to increase the chance of reproductive success. Once the species has been reestablished in the wild, this method may be a possible way for the wild population to be monitored reproductively. This analysis could also be adapted for other uses in the field (sex determination/ratios).

### **Applications**

Fecal steroid applications have been used in other species for various purposes. It has been used for sex determination in Cranes (Schwartz et al., 1991) and for the evaluation of reproductive cycles and pregnancy in several carnivore species (Gross et al., 1992). This has proven to be a reliable non-invasive technique for sexing cranes and a valid procedure for quantitating fecal hormones relative to reproductive events in several species (Gross et al., 1992). Fecal steroids are being used to chart reproductive cycles in Maned wolves (*Chrysocyon brachyurus*) (Gross, et al., 1991 A), Cheetah (*Acinonyx jubatus*) (Gross, 1991 B), Asian small clawed otters (*Aonyx cinera*) (Gross, 1992), and Tamandua (*Tamandua tetradactyla*) (Lien, et al., 1992) to name just a few. Fecal steroid analysis has also been validated on female Black-footed ferrets at the Omaha Zoo (Gross, et al., 1990). This analysis has been used to detect pregnant versus non-pregnant animals to help in



## **Correlation of Testicular Size to Fecal Steroid Concentrations in Black-footed Ferrets**, *Continued*

management decisions. The development and application of these procedures to other exotic species should be a useful management tool in the future.

### **Acknowledgments**

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I also wish to thank Susan Barnard, AAZK Research/Grants Chairperson for her patience in receiving this manuscript.

Thanks also to Sam Winslow, Curator of Mammals at Zoo Atlanta and Tony Vecchio, Director of the Roger Williams Park Zoo for their review of this manuscript.

### **References**

- Gross, T.S. Development and use of faecal steroid analyses in several captive carnivore species. In: Proceedings, 1st International Symposium of Faecal Steroid Monitoring in Zoo Animals, 1992.
- Gross, T.S., Tharnish, T. and Rodden, M. Fecal steroid analyses as an assessment of reproductive function in the maned wolf (*Chrysocyon brachyurus*). 1991 AAZV Conference Proceedings.
- Gross, T.S., Asa, C.S., Plotka, E.D., Junge, R.E., Bircher, J.S., Noble, G.A., Patton, M., and Tharnish, T., Non-invasive assessment of reproductive function in the cheetah (*Acinonyx jubatus*) utilizing fecal steroid analyses. 1991 AAZPA Conference Proceedings.
- Gross, T.S., Wieser, C.M., Armstrong, D.L., Bradley, J.E., Pettit, G.J., Cassidy, D.G., and Simmons, L.G. Analysis of the ovarian cycle in black-footed ferrets (*Mustela nigripes*) by vaginal cytology and fecal hormone measurement. *Biol. Reprod.* 42 (Suppl. 1): 50. 1990.
- Lien, S., Gross, T.S., Tharnish, T. and Platz, J.E. Copulatory behavior in relation to female estrus cycle in South American lesser anteater (*Tamandua tetradactyla*). *Proc. Ann. Meeting Nebraska Acad. Sci.* 1992.
- Nalbandov, A.V. Reproductive Physiology of Mammals and Birds. pp. 222-23. 1976 Freeman Press.
- Schwartz, J.R., Cuevas, L. Patton, M. and Gross, T.S. Sex determination in cranes using fecal steroid analyses. *Biol. Reprod.* 43 (Suppl. 1): 60. 1991.
- Seal, U.S., Thorne, E.T., Bogan, M.A., Anderson, S.H. Conservation Biology and the Black-footed Ferrets. Yale University Press, 1989.
- Thorne, E.T. Black-footed Ferret Recovery Plan. U.S. Fish and Wildlife Service, 1988.
- Wieser, C.M., Gross, T.S., and Patton, M. Steroid metabolism and excretion in Siberian polecats. *Proc. Ann. Meeting Nebraska Acad. Sci.* 1991.
- Wieser, C.M. Black-footed Ferret Management at Omaha's Henry Doorly Zoo. 1990 AAZK Conference Proceedings.
- Williams, E.S., Thorne, E.T., Kwiatkowski, D.R., Lutz, K. and Anderson, S.L. Comparative vaginal cytology of the estrous cycle of black-footed ferrets (*Mustela nigripes*), Siberian polecats (*M. eversmanni*), and domestic ferrets (*M. putorius furo*). *J. Vet. Diagn. Invest.* 4:38-44 (1992).

### **Key Terms**

Testicular recrudescence - testes migrate from the body cavity to the scrotum before the onset of the breeding season.

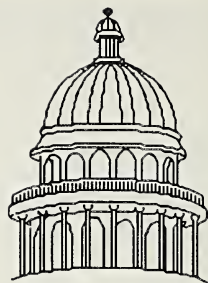
Competitive binding assay - assay procedure in which the ligand (in this case, testosterone) competes for binding sites with the antibody to the ligand resulting in a precipitate which is counted on a gamma counter.





# Legislative Outlook

Compiled by  
Phyllis Nilson-Wojcik  
Legislative Advisor



## Wetlands Report

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Wetlands occupy only 5% of the land in the lower 48 states but are crucial to 43% of all plant and animals on the federal Endangered Species List who use these aquatic oases for feeding, breeding, and shelter. A report by the National Wildlife Federation warns that wetlands "are being destroyed at the dizzying rate of 35 acres an hour".

Man-made wetlands are being used across the country for purposes of alternatives or enhancements to waste water treatment facilities. These man-made wetlands cannot offer substitutes however to the habitats necessary for countless species, or for flood control and recharge of groundwater.

The National Wildlife Federation's new 49-page study, Endangered Species Endangered Wetlands: Life on the Edge, is a comprehensive summary of the crisis of wetland-dependent endangered species. While serving as a scientifically sound synopsis of conditions in all 50 states, the study sounds a call to action to save our wetlands. Charts, graphs and text enumerate why and how to join the battle. It may be ordered from the National Wildlife Federation. Dept. 318, 1400 16th St. NW, Washington, DC 20036-2266 for \$6.75; ask for item #7932.

> from National Wildlife Federation's National Wildlife magazine Oct/Nov 1992 and NWF's EnviroAction, Oct. 1992.

## "Wise Use" Movement

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Jay Hair, the president of the National Wildlife Federation, recently wrote of the pseudo-grassroots groups formed to "ensure that a certain special interest will be allowed to continue to pollute or exploit resources for the private profit of a few". This "wise use" movement is gaining momentum, claiming to represent "grassroots America", when opinion polls have shown the majority of Americans believe we need strong environmental protection. This campaign consists of 400 organizations representing ranchers, farmers, miners, loggers, fishermen, some property rights groups and recreationists, with much corporate money going to fund the groups.

Ron Arnold, one of the "wise use" movement leaders, believes the environmental movement is destroying the economy unnecessarily, and that the only way to fight an activist movement is to use another activist movement. These individual groups represent anywhere from single digit to hundreds of thousands in their membership. As this movement gains power from boardrooms and politicians, we need to take their threats seriously and react. The following is an example of some groups in the "wise use" movement and their goals:

**Endangered Species Reform Coalition:** Utility companies and other industries to promote efforts to weaken the Endangered Species Act.

**American Forest Resource Alliance:** Representing 350 timber and logging companies, they work to inhibit federal action protecting the vanishing old growth forests.

## **Legislative News,** *Continued*

National Wetlands Coalition: With the goal of weakening wetlands protection laws, its members are real estate, oil and gas companies, including the International Council of Shopping Centers.

>from National Wildlife Federation's *National Wildlife* magazine, Oct/Nov. 1992

### **Whooping Crane Numbers Up in '92 Reintroduction Planned for Florida**

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Record production among endangered Whooping Cranes means more of the rare birds will make the 2500-mile trek from Canada to Texas this fall. The USFWS expects about 145 Whooping cranes to migrate from nesting grounds in Canada to spend the winter in and around the Aransas National Wildlife Refuge along the Texas Gulf Coast. The numbers of migrating cranes is up from 1991 when high losses and poor nesting success resulted in only 132 birds making the journey. Biologists found that a record 40 pairs nested this year producing an estimated 35 chicks. Fifteen to 20 chicks survived and are expected to attempt the long migration, compared to only eight in 1991.

In a related story, it has been proposed to reintroduce the Whooping crane to the State of Florida in a joint project of the USFWS, the Canadian Wildlife Service, and the Florida Game and Fresh Water Fish Commission. The proposal calls for the release of from 9-12 juveniles within the State's Three Lakes Wildlife Management Area in south-central Florida. The release is scheduled for this month of next. The Florida flock will be made up of captive-reared birds from the Patuxent Wildlife Research Center in Laurel, MD, and the International Crane Foundation in Baraboo, WI. The birds have been conditioned for release into the wild by being reared in isolation from humans. The newly created Florida flock would be nonmigratory and remain in the Kissimmee Prairie region year-round. Studies of Whooping cranes have shown migration is a learned rather than innate behavior and the captive-reared flock is expected to develop into a nonmigratory population.

Such a population will have a greater chance of success, according to biologists on the Whooping Crane Recovery Team, because the birds would not face the hazards of migration, and inhabiting a more geographically limited area will increase the likelihood of birds finding compatible mates.

Reduced to only 16 birds in 1941, the Whooping crane population is making a slow comeback. The total population, including 92 captive birds, stands at about 250. This year's captive breeding produced 27 chicks. Whoopers were known to exist in Florida in the early 1900s with the last documented specimen having been shot near St. Augustine in 1927 or 1928.

>Department of the Interior News Releases Sept. 25 and Oct. 1 1992





# Book Review

## **The Maintenance of Bats in Captivity**

By Susan M. Barnard ©Copyright 1991

Spiral Bound 184 pgs. with 84 illustrations

U.S. \$7.95; Canada & Mexico \$8.75 surface/\$9.50 air

Other Countries: \$11.00 surface/ \$15.00 air

Order from author: 6146 Fieldcrest Dr., Morrow, GA 30260

*Review by Eric Krussman  
Animal Keeper, Mammal Dept.  
National Zoological Park  
Washington, DC*

Susan Barnard's Maintenance of Bats in Captivity provides its reader with the many aspects of rehabilitation and care of insectivorous, frugivorous, and sanguivorous species of *Chiroptera*.

The book describes the realities and hardships of rehabilitation. It tells of a commitment and advises on situations encountered as a caretaker of an animal which may have a lifespan of up to thirty years. Instruction is given as to how, when, and if a release is appropriate.

Barnard's work is not solely for the rehabilitator, its diverse husbandry sections provide an excellent resource for general bat caretakers as well. Some topics discussed include handling, transportation, restraint, feeding requirements, hand-raising, hygiene, and medical needs. Temperature ranges and housing materials are explained to be critical for the proper care of varied species. Illustrations of housing are provided for the most popular of the more than 800 species.

The information presented in these husbandry sections is comprehensive and includes possible problems and their solutions. "The diet of insectivorous bats can also be varied during warm months by feeding them net sweepings.....Avoid feeding bats insects that have been exposed to toxins used in weed and pest control." Instruction is provided on the maintenance of insect colonies for the dietary needs of insectivorous bats.

One section is devoted to the needs of bats used in education programs, including handling guidelines for demonstrations and the conditioning of the animals for such usage.

The cited literature and recommended reading list are an excellent reference for additional bat information. I recommend The Maintenance of Bats in Captivity to anyone who works with or has an interest in these flying mammals.

## **A Naturalist In New Guinea**

By Bruce M. Beehler

University of Texas Press

P.O. Box 7819, Austin, TX 78713

241 pgs. Hardback \$24.95

*Review by Bonnie Wyatt  
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Bruce Beehler's New Guinea experiences begin as a recent college graduate on his first travel overseas. Starting in 1975, and extending over a decade, he describes various field trips into the interior of the New Guinea rainforest. His chronological narrative is based on each of these expeditions.

If you have ever wondered what it might be like to do fieldwork, or live in a totally different culture and environment, you will enjoy Beehler's account of the fun times and difficulties encountered in the Papuan forest.



## **Book Review**, *Continued*

As an authority on New Guinea ornithology, Beehler gives us a lively description of the various behaviors and habits of Birds of Paradise. Each species has its own mating system - some monogamous and others a range of polygamous strategies. The Birds of Paradise have been discovered to be of great importance in the dispersal of seeds, but many are insect foragers. Anyone interested in ornithology can appreciate the exciting, vivid descriptions of behavior never before documented.

Each chapter leads us deeper into rarely visited areas of the Papuan forest. It is more than just a study of rainforest birds, as Beehler also includes descriptive information on other flora and fauna. From the sodden alpine grasslands of Mount Bargeta, to the lowland forest, we are given a chance to feel like participants in the trials and joys of doing fieldwork in a tropical environment.

The section "People, Plumes, Bride-Price and Warfare" stresses the importance of ceremony and ritual in the lives of the New Guinea people. Plumes of the Birds of Paradise are all used in ritual dress, each tribe having its own style. Not only are plums used for headdress, but on other parts of the body also. Tusks of wild boar, shells, quills, bamboo plugs, beetles, paint, snake skin, beads, cloth and flowers are also used to enhance the beauty of the people.

Intertribal warfare remains a way of life in the highlands. Tribal conflict was brought right into camp when Beehler set up between two feuding clans. The warm camp fires were a place to stop and chat for the fearsome looking men armed with axes and bows. In one instance, the author was witness to a pay-back, but instead of warfare, the tribes exchanged money and pigs.

This is interesting reading to all who may someday visit or study in a rainforest. The photos are by the author. They include some very impressive shots of the Birds of Paradise, as well as pictures which adequately capture the lives of the native people.

As much as seventy-five percent of New Guinea's original forest remains, but the entire lowland forest could be lost in a single lifetime. Many New Guinea elders have direct control over their traditional land, and wish for it to remain untouched. The New Guinea government is protective of the villager's interests, but how long can the will of the people triumph over the greed of the timber industry?



## **Information Please**

Anyone with information on feeding, housing or breeding River Otters (*Lontra canadensis*) please send any and all information to: Barbara Gregory, Penna. Game Commission Rehabilitation, 515 Sipe Rd., York Haven, PA 17370. I would appreciate names of recommended books or journals available. Source to contact concerning any of the above problems FAX to 1-717-938-8231. I will be happy to pay postage or any other expenses incurred for sending information. Call toll free 1-800-296-4040.

I would be pleased to hear from any keepers who have had success breeding Fennec foxes (*Fennecus zerda*). Whatever you think has been pertinent to that success: diet, temperature, light, exhibit dimensions, furniture, dens or burrows, social relations. i.e. more than one female or male in the group, places to get away from each other, periods of separation, etc. Would also appreciate any tips on rearing young, should we get lucky. Send to: Mike Seidman, Phoenix Zoo, 455 N. Galvin Prkwy., Papago Park, Phoenix, AZ 85008-3431.

I will be traveling to the South Pacific Island group of Vanuata (west of Figi) during the summer of 1993. I will be verifying and documenting the existence and incidence of Hermaphroditic/Intersex pigs on these islands. Very little has been written on this subject since 1924. Anyone with a special interest in this area or if there is anyone who is aware of any documentation on Intersex species in general, your correspondence would be appreciated. Please contact: Mac McIntyre, Hoofstock Supervisor, White Oak Conservation Center, 726 Owens Road, Yulee, FL 32097 (904) 225-3314 [w] (904) 261-5630 [h].



# A Note on the Castration of Two Giant Indian Fruit Bats (*Pteropus giganteus*)

By

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and

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## Introduction

Because space is limited for maintaining wildlife in captivity, reproduction must be managed carefully. To help minimize animal surpluses, zoos use a variety of birth-control methods such as oral hormonal supplementation, hormone implants, vasectomies, castration, and physical separation of the sexes. This paper discusses a clinical procedure for the reproductive management of pteropodids

## Background

On 22 September 1988, two captive-born female giant Indian fruit bats (*Pteropus giganteus*) were received by the first author for use in educational programs. In December of the same year, each gave birth to a male infant. A cage (measuring approx. 1.80m high by 1.80m deep by 2.43m long) designed for two flying foxes, now housed four. As space was limited, cage expansion was impossible. The decision was made to castrate the male bats to prevent them from breeding with their mothers and thereby creating overcrowded housing conditions.

## Surgical Procedure

On 1 March 1990 the males were admitted for surgery at the second author's veterinary facility. The previous evening, the bats were deprived of food and water for approximately eight hours. The animals were alert, responsive and in good physical condition, weighing 491g and 580g. To prevent hypersalivation and possible pulmonary edema, atropine was administered subcutaneously to each bat at a dosage of 0.05mg/kg ten minutes prior to anesthesia. Anesthesia was induced and maintained with isoflurane by mask (see Fig. 1).

The area around the scrotum and prepuce was clipped and scrubbed for aseptic surgery with a chlorhexidine solution, followed by an isopropyl alcohol rinse and an application of polyhydroxy spray. The surgical site was then draped. An incision was made on the median raphe of the prepuce beginning at the base of the scrotum and extending cranially for 1.5cm. The left scrotum was compressed to create a bulge in the incision. Exposure was continued by sharp dissection. The tunics were opened and a medium hemacclip (Weck) was placed across the *vas deferens* and vessels. After removing the tissues distal to the clip, the procedure was repeated on the right side. Closure (see Fig. 2) was accomplished with a single layer of 4-0 coated Vicryl (Ethicon) in a continuous subcuticular pattern.

Although recovery was otherwise uneventful, one bat had an episode of bleeding from the incision 4-5 hours after surgery. The bleeding was controlled easily with pressure and an ice pack.

## Discussion

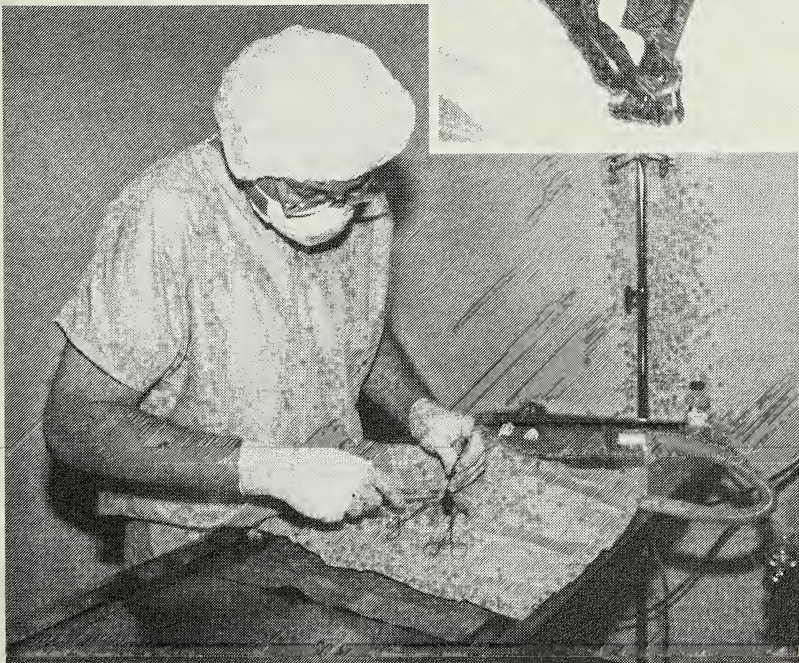
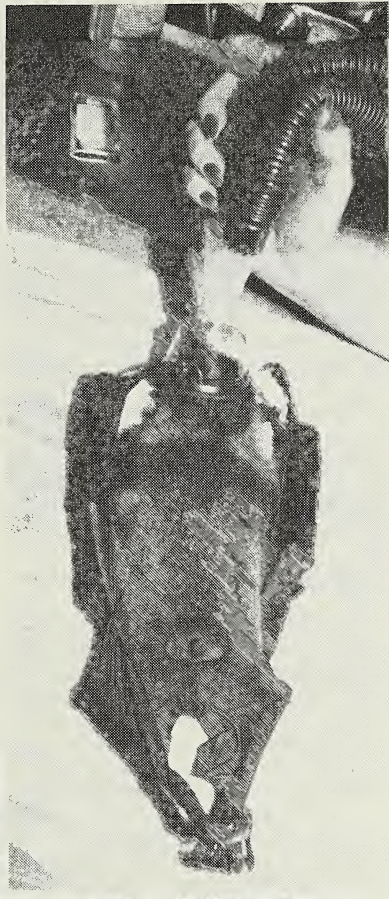
A literature search produced one publication on castration in bats (see Rao and Bhide, 1986). Rao and Bhide reported a significant increase in the weight of the castrated bats compared to control animals. The range of normal weights for *P. giganteus* reported by Prater (1980)



**FIGURE 1, at right, shows Isoflurane anesthesia being administered to a Flying Fox prior to surgery.**

*Photos by Susan M. Barnard*

**FIGURE 2, below, shows the surgical setup for the castration of a Flying fox.**





## A Note on the Castration of Two Giant Indian Fruit Bats, *Continued*

was 568-625g. In this report, only one bat's weight increased greatly two years post-castration: weights were 577g (up 17.5%) and 831g (up 43.3%). Although a weight gain would be expected in maturing animals, the heavier bat was dominant and was able to eat unchallenged until satiation. In order to regulate the daily food intake of the bats, the cage was partitioned on 18 January 1992, resulting in two mother/son pairs. Since separation, the following weights have been recorded for the heavier male: 10 April 1992, 652g; 23 June 1992, 595g (currently holding at this weight).

Rao and Bhide also reported changes in the behavior of their gonadectomized bats. They stated that prior to castration, the bats were "ferocious and active", but two weeks after surgery, the bats became "dull and unresponsive". The two bats described herein exhibited no notable post-surgical behavioral changes. The behavioral changes described by Rao and Bhide may not have been the result of castration, but rather a consequence of the captive environment and/or a post-operative, sub-clinical infection. Alternately, Rao and Bhide were working with *Rousettus leschenaulti*, and it is possible that bats of different species and ages may also react differently to castration.

Perhaps the most important concern in using castration as a management technique to control captive flying fox populations is the possibility of adrenal-cortical tumors. Rao and Bhide reported that castrated, sexually active *R. Leschenaulti* developed such tumors. According to Gopalakrishna and Rao (1977) and Ramakrishna and Rao (1977), it is not known whether different species, with varying reproductive patterns, will differ in the occurrence of adrenal-cortical tumors.

### Conclusion

Birth control by castration is, unfortunately, irrevocable. There is also the possibility that gonadectomized bats may develop adrenal-cortical tumors. Nevertheless, it offers several advantages including lower costs compared with hormonal birth-control, and elimination of the need for additional space to separate the sexes.

### Literature Cited

- Gopalakrishna, A. and Rao, K.V.B. 1977. Breeding habits and associated phenomena in some Indian bats. Part I. *Rousettus leschenaulti* (Desmarest) - Megachiroptera. J. Bombay Nat. Hist. Soc., 74: 1-16.
- Ramakrishna, A. and Rao, K.V.B. 1977. Reproductive adaptations in the rhinolophid bat *Rhiolophus rouxi* (Temminck). Curr. Sci., 46: 270-271.
- Rao, K.V.B. and Bhide, S.A. 1986. Effect of bilateral castration on adrenal glands in the Indian fruit bat, *Rousettus leschenaulti* (Desmarest) (Mammalia, Chiroptera). Annls. Soc. r. zool. Belg., 123: 235-243.
- Prater, S.H. 1980. *THE BOOK OF INDIAN ANIMALS*. Oxford University Press, NY, NY.

### Acknowledgments

The authors thank Dr. Debra Forthman, Mr. Reg Hoyt, Dr. Brian E. Joseph and Dr. Dietrich Schaaf for their helpful comments in reviewing this manuscript.

(Received for publication on 3 April 1992)



# Pacing in Captive Raccoons

A Case Study at the Virginia Living Museum, a combination native wildlife park, botanical garden, planetarium and environmental science education facility

By Kathy Dennehey, Animal Keeper  
Virginia Living Museum, Newport News, VA

As many zoos can substantiate, pacing is a common problem in captive carnivores. At the Virginia Living Museum where I am an animal keeper, two female Raccoons (*Procyon lotor*) exhibit this behavior. A series of modifications to the diet was executed in an attempt to control the pacing. These modifications were:

1. Changing of feeding time from evening to morning.
2. Adding of a supplementary diet of crayfish and raisins in the afternoon.
3. Introducing natural "toys" to the exhibit
4. Splitting the morning diet in half (feeding half in the morning and half in the early afternoon).

It was hoped that through these modifications the pacing would be replaced by natural behaviors such as foraging or sleeping.

The problem of pacing in the raccoons started to be considered before this project was started; and the first modification to the diet was done before serious observations had begun. It was estimated, through casual observations of staff and volunteers, that the raccoons paced 70-80% of the time while on exhibit. The raccoons were on exhibit from 0900-1700 hours Monday through Saturday, and 1200-1700 hours on Sunday. At night they were taken off exhibit and placed in a smaller den. As this behavior was disconcerting to see and there were complaints of the animals being "unhappy", measures were taken in an attempt to control the behavior.

More hollow logs were added to the exhibit, and the feeding time was shifted so that the food was being hidden around the exhibit in the morning when the raccoons were let out (as opposed to the previous method of feeding in their den at night). Again through casual observations the raccoons were seen to pace at 0900 after first being let out in the morning; they would stop and forage for a short period of time, but the pacing always resumed around 1400 hours. At this time more accurate observations were starting to be made and proposals were being made for further modifications.

The next step taken was to observe the raccoons to see exactly how much they paced. This was done by making several one-hour observations spanning the time that the raccoons were on exhibit. Raccoon activities were recorded at five-minute intervals during each hour. It was found that the raccoons paced 50% of the time spent on exhibit, with the majority of the pacing in the afternoon. One assumption for this was that the food was gone, so a supplemental diet of crayfish and raisins started to be fed in the afternoon. More observations were made to see if this change would have an impact on the pacing. The pacing did decrease to 20% of the time on exhibit, yet the pacing was still present so more modifications were made.

It was surmised that the pacing might be attributed to boredom, so natural "toys" were introduced. At first a rawhide bone was added which seemed to occupy the animals until it unraveled, and thus lost their interest. Later two more bones that were tethered were added to the exhibit. This time no attention was paid to the attached bones. Finally two coconuts with small holes cut in the top were introduced into the exhibit. The raccoons spent a lot of time attempting to get the meat from inside the coconut out, and occasionally fruit was

## **Pacing in Captive Raccoons, *Continued***

placed inside the coconut to create more difficulties. Despite the seeming preoccupation with the new "toys", the pacing did not decrease and in fact increased to 50% of the time again.

Dismayed by the new data received, another modification was planned. This time the morning diet was split to provide more opportunities for foraging throughout the day. It seemed that the more time that food was able to be hidden around the exhibit, the more time the raccoons would spend foraging. This was not able to be extensively observed however due to some complications resulting from the addition of a new raccoon.

As with the introduction of any new animal to an exhibit, observations must be made to determine if the animal is acclimating to its new environment. This also proved to be the appropriate time to see if the new raccoon would develop the pacing behavior. The raccoon spent most of the time exploring the exhibit and when it was not exploring it was sleeping. No pacing was observed in the new raccoon, and after about two weeks pacing seemed to decrease in the remaining female raccoon.

To date no significant studies have been done to determine the degree that the pacing has been reduced in the original female raccoon, or if it even has been reduced. There is the possibility that the new male raccoon has had some influence on the female not pacing, or it could perhaps be a seasonal variation. At any rate it is evident that the pacing to some extent was caused by lack of stimuli in the exhibit, and that the raccoons seemed to become "bored" with any items placed in the enclosure that had been used before. From this it is surmised that if enough varying stimuli are placed in the exhibit, the pacing behavior should decrease, however this has yet to be proven.



## **AAZK Announces New Professional/Contributing Members**

Alyssa DeMaria, Turtle Back Zoo (NJ)  
Laura Gaines, Elmwood Park Zoo (PA)  
Peter S. Miller, National Zoo (D.C.)  
Susie Disalle, Tiger's Eye Productions (FL)  
Kimberly Baldwin, Akron Zoo (OH)  
Debbie Palay, Lincoln Park Zoo (IL)  
David M. Wilson, Dallas Zoo (TX)  
Hugh Bailey, Dallas Zoo (TX)  
Ronney V. Steen, Caldwell Zoo (TX)  
Tracy Bennett, Cheyenne Mt. Zoo (CO)  
Nancy E. Brown, Mesa, AZ  
Carol A. Allen, Wildlife Safari (OR)

Allison Svanda, Cape May County Zoo (NJ)  
Julie Harshaw, National Zoo (D.C.)  
Michelle Avery, Tiger's Eye Productions (FL)  
Wendy Ensor, Akron Zoo (OH)  
Tim Sullivan, Chicago Zool. Society (IL)  
Chriss Gembarski, Oklahoma City Zoo (OK)  
Suzy R.E. Steele, Dallas Zoo (TX)  
Jamie Etheridge Burch, Dallas Zoo (TX)  
Tracey Anderson, Cheyenne Mt. Zoo (CO)  
Terry Burleaud, Phoenix, AZ  
Laurie Burch, Sea World of San Diego (CA)  
Heidi Wolfraat, Magnetic Hill Zoo (N.B.)

## **Renewing Contributing Members**

Bruce M. Thomas, Takoma Park, MD  
John Seyjagat, Director, The Lube Foundation, Gainesville, FL  
Curtis Burnette, Operations Director, Audubon Zoo, New Orleans, LA  
William H. Disher, Volunteer, San Diego Zoo & Wild Animal Park, San Diego, CA  
Tim Knight, Research Associate, Woodland Park Zoo, Seattle, WA



# Chapter News

## Gainesville Area AAZK

The new mailing address for this Chapter is: Gainesville Area AAZK, c/o Santa Fe Teaching Zoo, 3000 N.W. 83rd St., Gainesville, FL 32602. Facilities associated with this Chapter include: the Santa Fe Teaching Zoo, the Lube Foundation, Silver Springs, the University of Florida, the City of Gainesville's Morningside Nature Center and Kulaqua Zoo in Camp Kulaqua. The latter two facilities are newly affiliated with this Chapter.

Newly elected officers are:

President.....Kandy Roca, USDA Wildlife Research Center  
Vice Pres.....Rob Boyle, Santa Fe Teaching Zoo  
Secretary.....Nancy Hardesty, University of Florida Vet School  
Treasurer.....Clay Ecklund, Santa Fe Teaching Zoo  
Chapter Liaison.....Alycin Hayes, Morningside Nature Center

During the past six months our Chapter has had a variety of speakers. Pat Sammarco spoke to us on the Zoo Keeper as a Scientist. The director of the Lube Foundation, John Sejagit, and curators John Wiebe and Keith Atkinson talked about their bat and New World primate collection.

Dr. Isaza from the University of Florida Vet School showed slides and discussed the vet's role in zoo animal care and restraint. Jim Ellis showed slides and talked about his work in Brazilian Zoos. Alexis Thomas and Annie Bares put together a talk and slide show on husbandry and field collecting of Dart Poison Frogs. There was also a field trip to White Oak Plantation last summer.

Recently our Chapter has been active in helping the zoos hit by the hurricane in south Florida. Fifty dollars was sent to the Cypress Coast AAZK to enable them to buy supplies to take to Monkey Jungle. Pat Ashton of Morningside Nature Center donated \$50.00 to

Gainesville AAZK which was sent to the AAZPA Zoo Crisis Fund to help rebuild Miami Metro Zoo.

Other Chapter members donated non-perishable food and plastic storage containers. Jesse Martin of Morningside Nature Center donated a metal tool box full of tools valued at approximately \$200.00. Alycin Hayes loaded up her car and took all of the donations down to Dreher Park. From Dreher Park in West Palm Beach, zoo keeper Jay D'Amico took the donations the rest of the way down to Miami.

This fall our speakers have included Rachelle Wright of Silver Springs who spoke to us on 12 October about her recent trip to the National AAZK Conference in San Diego. Nancy Hardesty of the University of Florida Vet School will speak on 16 November about her recent work with the vets at Fossil Rim Wildlife Center in Texas. To finish the year there will be a Chapter Social at Cucu's, a local Mexican restaurant/Bar on 7 December.

--Alycin Hayes, Chapter Liaison

## San Diego AAZK Chapter

The Annual Monorail Tour at the Wild Animal Park was held on 10 September. Chapter members and guests were treated to a spectacular tour led by WAP Animal Care Manager Sharon Joseph and WAP Senior Bird Keeper, Tom Levites. WAP Animal Care Center Keeper and Chapter Vice President, Deanna Herfel, was this year's driver. There's nothing quite like a WAP monorail ride at dusk to observe animal/bird beauty and behavior.

Special thanks to the WAP Crew for making this event possible.

## 18th National Conference - Celebrating the 25th Anniversary of AAZK

The Zoological Society of San Diego and Sea World of San Diego were proud to host AAZK's 18th National Conference held 27 September - 2 October and themed "Celebrating Yesterday, Enriching Today, and Shaping Tomorrow".

## **Chapter News, Continued**

AAZK got its start at the San Diego Zoo; three of the seven Founding Fathers (Conrad Grayson, Gerald "Red" Thomas and Ken Willingham) were honored at the Conference Icebreaker by delegates nationally and worldwide. Editor Susan Chan and AAZK Historian and author Rachel Watkins Rogers were also on hand with the newly published book: Zoo and Aquarium Professionals: The History to AAZK.

Conference week was packed full of paper sessions, poster presentations, workshops, awards, trips, exhibitors, special guest speakers and tours of the Zoo, Wild Animal Park and Sea World. Fun-filled events included the Beach Party and Zoolympics. Silent and Live Auction nights raised a lot of money for AAZK.

In keeping with the three-part theme, guest speakers and keepers informed, inspired and shared ideas for enriching the lives of the animals for which they care.

There are too many people to thank individually for making the conference possible (but you know who you are !). Everyone involved with the 18 different conference committees, and the rest of the hard-working volunteers deserve a round of applause. I would especially like to thank the three most dedicated Zoo employees (and their spouses and spouses-to-be!) who headed the Conference Planning Committee and through their efforts were the backbone of the 18th National AAZK Conference: Steve Castillo, Senior Keeper; Guy Lichty, Lead Keeper; and Terri Peterson, Speaker's Bureau Coordinator.

I applaud everyone for a Conference well done!

--Mary Dural, Chapter Liaison

### **Western New York AAZK Chapter**

Our first annual "Bowling for Rhinos" event was held on 12 June at Mill Sher Lanes. It was a fun time for all the participants and spectators. This successful event raised over \$1700.00 for Ngare Sergoi Rhino Sanctuary. With

the help of a local artist, a "Bowling for Rhinos" logo was designed and put on T-shirts which were given to all bowlers and also were sold at the event.

Our Chapter is excited to announce the arrival of our ESP Conservation Parking Meter. The unveiling ceremony was held on 2 August, the same day as the Zoo's Peace Festival promotion. We felt that this was an appropriate day to hold the unveiling as we had children from the Peace Festival be the first ones to put coins into the Meter.

A new project our Chapter will be taking on involves New York's Adopt-A-Wetland Stewardship Program run by the Department of Environmental Conservation. The program enables various organizations to volunteer their time to maintain trail systems, update signs, and aid in educational and interpretive services in various refuges. Our Chapter will be working at the 236-acre Tillman Road Wildlife Management Area in Clarence, NY. In recognition of the efforts of the volunteer organization, a sign is put up in the refuge with the group's name and the fact that they took part in the Adopt-A-Wetland Program.

An ongoing project for our Chapter is the recycling of plastic, aluminum and cardboard. Funds are raised for the Chapter through the return of pop cans and numerous bake sales held during the year, as well as other fundraising efforts.

--Sherri Doherty, Secretary

### **Memphis Zoo AAZK Chapter**

Officers for 1992 are:

President.....Gair Karr  
Vice Pres.....Dena Mandino  
Secretary.....Kathy Fay  
Treasurer.....Lisa Mack  
Chapter Liaison.....Cindy Pinger

We participated in our second annual "Bowling for Rhinos" on 25 July raising \$1442.00 for the cause. Our fundraising idea (selling glow-light novelties at zoo events) has been quite successful. This has allowed us to

## Chapter News, *Continued*

sponsor three keepers so far to attend job-related conferences. We were also able to donate a cash gift to the keepers at Miami Metro Zoo.

Our Chapter also recently made a contribution to both the local and national Nature Conservancy. Our Chapter was approved to sell the AAZK 25th Anniversary pocket knives. If anyone is interested in the knives, please contact Memphis AAZK Chapter, Memphis Zoo, 2000 Galloway, Memphis, TN 38112 (901) 725-3414.

*--Cindy Pinger, Chapter Liaison*

### Mt. Tahoma Chapter (Point Defiance Zoo and Aquarium, Tacoma, WA)

Our tiny Chapter is doing very well and increasing our membership steadily. We have offered our support to the Florida zoo post-hurricane relief efforts, and regret that a check was the only way we could help from such a distance.

Our newest fundraising project is a zoo-wide offer for a 15-minute back massage by a local masseuse for mere pennies...well, bargain dollars. With our ESP Conservation Parking Meter and through the Adopt-an-Acre program we have so far contributed to the purchase of 400+ acres and we are very proud! It is our hope that all zoos will soon install these meters, as they are an excellent educational tool and fundraiser.

We have also sent Margaret Gaspari, our bat expert, to the AAZPA Conference.

*--Rana Bayracki, Chapter Liaison*

### Indianapolis Zoo

On behalf of the five delegates from the Indianapolis Chapter, I would like to take this opportunity to thank the San Diego Chapter for a great conference. All of us had a wonderful time and appreciate all the work you put into it. Thanks again and we look forward to seeing you next year in Atlanta.

*--Maria McManus, Chapter Liaison*

### Dallas Zoo AAZK Chapter

Upon hearing of the disaster of Hurricane Andrew, our Chapter quickly voted to send monetary aid to the AAZPA Zoo Crisis Fund. A total of \$325.00 was raised through a bake sale and this year's recycling efforts. We would like to wish all of our affected colleagues the best of luck and a timely recovery. If we can help in any way, let us know.

On 7 October, several of our Chapter members made a road trip to the Oklahoma City Zoological Gardens. Many thanks go to their Chapter for their hospitality in providing a wonderful pizza luncheon and special tours of the zoo.

We have had many informative presentations over the last two months. The four-hour BBC production of "Zoo 2000" was viewed in three segments and presented by Kevin Lew. Most recently, David Mandt and Joan Dodson gave a presentation and demonstration of basic self-defense methods that can be applied to animal restraint. Each of us learned something new as we tried these techniques on each other.

*--Kevin Lew, Chapter Liaison*





# **L.I.N.K.**

## **(Liaison and Information Network for Keepers)**

Coordinator for the LINK System: Mark de Denus, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba, Canada R3P 0R5. (204) 837-2916 (h).

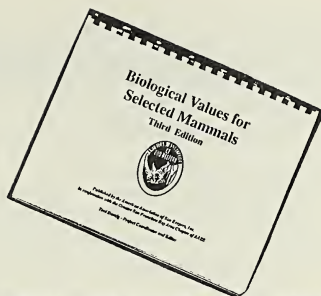
### **Regional Coordinators**

**ALABAMA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**ALASKA** - Vacancy  
**ARIZONA** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**ARKANSAS** - Debbie Jackson or Ann Rademacher, Little Rock Zoological Gardens, #1 Jonesboro Dr., Little Rock, AR 72205  
**CALIFORNIA** - Vacancy  
**COLORADO** - Suzanne Chacon-Brennan, Denver Zoo, City Park, Denver, CO 80205  
**CONNECTICUT** - Jeanette Nadeau, Roger Williams Park Zoo, Providence, RI 02905  
**DELEWARE** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**FLORIDA** - Rick Smith, 5752 Stoneridge, Orlando, FL 32839  
**GEORGIA** - Fred Alvey, Zoo Atlanta, 800 Cherokee Ave. S.E., Atlanta, GA 30315  
**HAWAII** - Michelle Suenishi, Hilton Hawaiian Village, 2950 Ena Rd., Honolulu, HI 96815  
**IDAHO** - Vacancy  
**ILLINOIS** - Pat Swieca, 5710 W. Cullom Ave., Chicago, IL 60634  
**INDIANA** - Dan Powell, Potawatomi Zoo, 500 S. Greenlawn, South Bend, IN 46615  
**IOWA** - Carla Wieser, Omaha's Henry Doorly Zoo, 10th St. & Deer Park Blvd., Omaha, NE 68107  
**KANSAS** - Gretchen Ziegler, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606  
**KENTUCKY** - Scott Wright, Cleveland Metroparks Zoo, 3900 Brookside Dr., Cleveland, OH 44109  
**LOUISIANA** - Michelle Asselin, Audubon Park & Zoological Gardens, P.O. Box 4327, New Orleans, LA 70115  
**MAINE** - Jeanette Nadeau (see addresses under CT)  
**MARYLAND** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA  
**MASSACHUSETTS** - Jeanette Nadeau (see addresses under CT)  
**MICHIGAN** - Dan Powell, Potawatomi Zoo, 500 S. Greenlawn, South Bend, IN 46615  
**MINNESOTA** - Tim Hill, Minnesota Zoological Gardens, 13000 Zoo Blvd., Apple Valley, MN 55124  
**MISSISSIPPI** - Jeannie Frazier, Jackson Zoological Park, 2918 W. Capitol, Jackson, MS 39209  
**MISSOURI** - Vacancy  
**MONTANA** - Vacancy  
**NEBRASKA** - Carla Wieser (see address under Iowa)  
**NEVADA** - Patricia Simonet, Wildlife Safaris, P.O. Box 6735, Incline Village, NV 89450  
**NEW HAMPSHIRE** - Jeanette Nadeau (see addresses under CT)  
**NEW JERSEY** - Theresa Maas, Philadelphia Zoo, 34th & Girard Ave., Philadelphia, PA 19104  
**NEW MEXICO** - Bruce Eneboe, Reid Park Zoo, 1100 S. Randolph Way, Tucson, AZ 85716  
**EAST NEW YORK** - Frank Leonard, Bronx Zoo, 185th & Southern Blvd., Bronx, NY 10460  
**WEST NEW YORK** - Alan Baker, Burnet Park Zoo, 500 Burnet Park Dr., Syracuse, NY 13204  
**NORTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**NORTH DAKOTA** - Bob Debets, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba Canada R3P 0R5 (204) 986-4040 [w]  
**OHIO** - Scott Wright, Cleveland Metroparks Zoo, 3900 Brookside Dr., Cleveland, OH 44109  
**OKLAHOMA** - Debbie Jackson or Ann Rademacher (see addresses under AR)  
**OREGON** - Anna Michel, Washington Park Zoo, 4001 SW Canyon Rd., Portland, OR 97221  
**PENNSYLVANIA** - Theresa Maas, Philadelphia Zoo, 3400 W. Girard, Philadelphia, PA 19104  
**RHODE ISLAND** - Jeanette Nadeau (see addresses under CT)  
**SOUTH CAROLINA** - Lucy Segerson, North Carolina Zoo, Rt. 4, Box 83, Asheboro, NC 27203  
**SOUTH DAKOTA** - Bob Debets (see address under ND)  
**TENNESSEE** - Gail Karr or Cindy Pinger, Memphis Zoo & Aquarium, 2000 Galloway, Memphis, TN 38112  
**TEXAS** - Ann Marie Greco, San Antonio Zoo, 3903 N. St. Mary's St., San Antonio, TX 78212  
**UTAH** - Suzanne Chacon-Brennan, Denver Zoo, City Park, Denver, CO 80205  
**VERMONT** - Jeanette Nadeau (see addresses under CT)  
**VIRGINIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**WASHINGTON** - Elandra Aum, Woodland Park Zoo, 5500 Phinney Ave. N, Seattle, WA 98103  
**WEST VIRGINIA** - Theresa Maas, Philadelphia Zoo, 34th & Girard, Philadelphia, PA 19104  
**WISCONSIN** - Wayne Hazlett, 3768 S. 89th St., Milwaukee, WI 53228  
**WYOMING** - Vacancy  
**DISTRICT OF COLUMBIA** - Theresa Maas (see address under PA)  
**Province of Ontario** - Neil Porter, Metro Toronto Zoo, Box 280, West Hill, Ontario M1E 4R5 Canada  
**Provinces of Manitoba & Saskatchewan** - Bob Debets (see address under ND)  
**Province of Quebec** - Vacancy  
**Provinces of Alberta & British Columbia** - Grant Tkachuk, 10139 157th St., #206, Edmonton, Alberta T5P 2T9



Now Available

# Biological Values for Selected Mammals Third Edition - 1992



AAZK, Inc. is pleased to announce the availability of Biological Values for Selected Mammals, Third Edition. This important reference work is a project of the Greater San Francisco Bay Area Chapter of AAZK and was the result of thousands of hours of volunteer time spent in collecting data, doing computer entry, editing, proofreading, etc. Project Coordinator and Editor was Toni Danzig of San Francisco.

This Third Edition differs in a number of respects from the previous two editions. This 1992 edition is published in an 8 1/2 by 11 inch format and is comb-bound. It contains information on 457 species of mammals and covers values ranging from geographic range and habitat to Circadian cycle, size/measurements, reproductive data, life expectancy, body temperature, rearing information and status in the wild to name a few. About half of the species listings also include habitat range maps. Every attempt has been made to use only the most widely accepted scientific resources for data gathering. The volume contains a complete bibliography of references utilized.

Biological Values for Selected Mammals - Third Edition may now be ordered through the AAZK Administrative Offices. Please fill in the form below and return with your check or money order (U.S. FUNDS ONLY) to: BV III, AAZK, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK, Inc."

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**ANIMAL KEEPER**...requires high school diploma or GED, one year's experience with captive exotics and writing/verbal/record keeping skills. Biology or Zoology degree preferred. Responsible for care, feeding, health-safety of animals; exhibit maintenance; behavior observation; interaction with the public. Send resume and cover letter to: Philadelphia Zoo, 3400 West Girard Ave., Philadelphia, PA 19104. EOE.

**ZOOKEEPER/JUNIOR NATURALIST COORDINATOR**...responsible for ongoing animal care/exhibit maintenance; record keeping, meeting USDA requirements; working on a variety of projects with zoo staff, zoo manager and program personnel. Duties also include coordination of weekend/event oversight and administration of the Junior Naturalist Program. The candidate must be comfortable interfacing with the public. Qualifications: minimum of two years working with a variety of animals; experience in wildlife exhibit repair and maintenance; experience working with youths and understanding of program development and management. Knowledge in environmental fields and museum experience a plus. BA required, MA/MS preferred. Salary commensurate with qualifications and experience. Send resume/CV, salary requirements, and three references (including address, phone, and relationship) by 15 November to: Pam Landry, Zoo Manager, The New England Science Center, 222 Harrington Way, Worcester, MA 01604. Affirmative Action Equal Opportunity Employer. Minorities, women and others are encouraged to apply.



## ***Gorilla Fund Celebrates 25 Years***

In honor of the 25th anniversary of the founding of the Karisoke Research Center by Dr. Dian Fossey, the Board of Trustees of the Digit Fund have announced a name change to the Dian Fossey Gorilla Fund. Also of interest to the AAZK membership is the fact that Richard Block, formerly Director of Public Programs for the World Wildlife Fund, has been named Executive Director of the newly renamed Fund.



On 25 September 1967, anthropologist Fossey established Karisoke in the Virunga Mountains of Rwanda. At that time the highly endangered great apes numbered an estimated 242 worldwide. Dr. Fossey devoted 18 years of her life, until her murder in 1985, to protecting and preserving the Mountain gorillas. Today, the Mountain gorilla population in Rwanda and Zaire has increased to 320 with another 300 of the species recently identified in the Impenetrable Forest of Uganda.

The Dian Fossey  
**Gorilla Fund**  
Founded in Memory of Digit

The Fund, originally named for Digit, a silverback male killed defending his family from poachers, focuses its operation on an aggressive antipoaching campaign, the support of Rwanda's gorilla tourism industry, the provision of veterinary care through the Fund's affiliate Morris Animal Foundation, and educational programs for students in Rwanda and around the world.

For more information about the Dian Fossey Gorilla Fund, contact its offices in the U.S. at 45 Inverness Dr. E., Suite B., Englewood, CO 80112-5480; (303) 790-2349; or in the UK at 110 Gloucester Avenue, Primrose Hill, London, NW1 8JA England; 071 483 2681.





# AAZK Membership Application

Name \_\_\_\_\_ check here if renewal [    ]

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*Those not connected with  
an animal facility*
- ☐ \$55.00 or up Contributing/Canada  
*Individuals*
- ☐ \$55.00 or up Institutional/Canada  
*Organizations/Institutions  
(requires Board approval)*

## International Members

- ☐ \$40.00 International  
*All members outside U.S. &  
Canada regardless of category*

## Library Only

- ☐ \$20.00 Library  
*Available only to  
established libraries*

Zoo Affiliation (if any) \_\_\_\_\_

Zoo Address \_\_\_\_\_

Title \_\_\_\_\_

Work Area \_\_\_\_\_

Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), made payable to American Association of Zoo Keepers, Inc., to : AAZK Administrative Offices, Topeka Zoo, 635 S.W. Gage Blvd., Topeka, KS 66606 U.S.A.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

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Topeka, KS 66606

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# Animal Keepers' Forum

December 1992

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# **AAZK Membership Application**

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City \_\_\_\_\_ State/Province \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_ (home) \_\_\_\_\_ (work) \_\_\_\_\_

## **U.S. Members**

- ☐ **\$30.00 Professional/U.S.**  
*Full-time Keepers*
- ☐ **\$25.00 Affiliate/U.S.**  
*Other staff & volunteers*
- ☐ **\$25.00 Associate/U.S.**  
*Those not connected with  
an animal facility*
- ☐ **\$50.00 or up Contributing/U.S.**  
*Individuals*
- ☐ **\$50.00 or up Institutional/U.S.**  
*Organizations/Institutions  
(requires Board approval)*

## **Canadian Members**

- ☐ **\$35.00 Professional/Canada**  
*Full-time Keepers*
- ☐ **\$30.00 Affiliate/Canada**  
*Other staff & volunteers*
- ☐ **\$30.00 Associate/Canada**  
*Those not connected with  
an animal facility*
- ☐ **\$55.00 or up Contributing/Canada**  
*Individuals*
- ☐ **\$55.00 or up Institutional/Canada**  
*Organizations/Institutions  
(requires Board approval)*

## **International Members**

- ☐ **\$40.00 International**  
*All members outside U.S. &  
Canada regardless of category*

## **Library Only**

- ☐ **\$20.00 Library**  
*Available only to  
established libraries*

Zoo Affiliation (if any) \_\_\_\_\_

Zoo Address \_\_\_\_\_

Title \_\_\_\_\_

Work Area \_\_\_\_\_

Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), made payable to American Association of Zoo Keepers, Inc., to : AAZK Administrative Offices, Topeka Zoo, 635 S.W. Gage Blvd., Topeka, KS 66606 U.S.A.

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### Information for Contributors

Animal Keepers' Forum publishes original papers and news items of interest to the animal keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed and double-spaced. All illustrations, graphs, charts and tables should be clearly marked, in final form, and should fit in a page size **no greater than** 15cm x 25 1/2cm ( 6" x 10"). Literature used should be cited in the text (Brown, 1986) and alphabetically in final bibliography. Avoid footnotes. Include scientific name of species (as per ISIS) the first time it is used. Thereafter use common name. Use metric system for weights and measurements (standard equivalents may be noted in parenthesis). Use the continental dating system (day-month-year). Times should be listed as per the 24-hour clock (0800, 1630 hrs. etc.) Black and white photos only are accepted. Color slides should be converted to black and white prints (minimum size 3 x 5 inch) before submission. Clearly marked captions should accompany photos. Please list photo credit.

Articles sent to Animal Keepers' Forum will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKE. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope. Telephone or FAX contributions of late-breaking news or last-minute insertions are accepted. However, long articles must be sent by U.S. mail. The phone number is (913) 272-5821 Ext. 31.

### DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the  
Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers, Inc.  
Publication does not indicate endorsement by the Association.

Items in this publication may be reprinted providing credit to this publication is given and a copy of the reprinted material is forwarded to the editor. Reprints of material appearing in this journal may be ordered from the editor. Back issues are available for \$2.00 each.

*This month's cover features a Panther chameleon (Chamaeleo pardalis) drawn by Fawn Prevost, Tropical Rain Forest Keeper at the Topeka Zoological Park, Topeka, KS. This Madagascan species was introduced by man to the islands of Reunion and Mauritius where it lives in humid jungles. This 40-48.5cm long lizard is predominantly green in color and sometimes has broad dark red cross bands and a light green longitudinal stripe. Colors however, may range from bluish green to a drab brown in females. Like others of this genus, it has eyes which can move independently of one another and a prehensile tail which aids its climbing in the tree tops. When annoyed they will puff up, and typical of all chameleons, the Panther Chameleon can vary its color tones when alarmed. This particular specimen is a male named Colin. Thanks, Fawn!*

## Scoops

and

## Scuttlebutt

### All Chapters Reminded of Recharter Obligations

All Chapters are asked to be on the lookout for their Chapter Recharter Packet which will be mailed to them in early January. In order to remain an active Chapter in good standing with the Association, the forms in this packet, along with your Recharter Fee, must be returned to Administrative Offices **by 1 March 1993**. Please keep in mind that it is very important that you notify AAZK of any changes in either the name or address of your Chapter, as AAZK, Inc. must report this information to the Internal Revenue Service annually. We thank you in advance for your cooperation and prompt return of the Recharter Packet. If you have questions concerning filling out the forms, please call Barbara at 1-800-242-4519 and she will be happy to assist you.

### 1992 Conference Proceedings May Be Ordered Now

Please be aware that an order form for the 1992 Conference Proceedings from San Diego appears in this issue of *AKE*. The form lists the papers which will be included as well as information on how to place your order. The form will also appear in the January issue of *AKE*. But please note, that all orders **must** be received by **10 February 1993**. Speakers who presented a paper and submitted it for publication will receive a gratis copy of these Proceedings. All others (including Conference delegates) will need to order a copy if they want one. Please be aware that after the deadline, we will print copies for those placing orders plus a very limited number of extra copies. Once those are sold there will be no more copies printed. Individual papers will be available for \$2.00 each after that time. This Conference Proceedings is the largest we have ever had, offers a wide variety of papers as well as synopsis of the workshops presented and abstracts from the poster sessions.

### **AAZK Grants Available**

The American Association of Zoo Keepers, Inc. announces the availability of two \$750 research grants in the field of zoo biology. Interested applicants should direct their inquiries to Sue Barnard, Chairperson, AAZK Research/Grants Committee, Zoo Atlanta, Department of Herpetology, 800 Cherokee Ave. S.E., Atlanta, GA 30315. The deadline for submission is 1 March 1993.





# Births & Hatchings



**Milwaukee County Zoo (Milwaukee, WI)**...reports the following significant B&H from 1 June through 9 October 1992:

**Mammals** - 0.1 Bactrian camel (*Camelus bactrianus*) [E]; 0.0.2 Straw-colored fruit bats (*Eidolon helvum*) [mother-reared]; 0.0.1 Vampire bat (*Desmodus rotundus*) [58th birth at MCZ].

**Birds** - 1.2 Crested wood partridge (*Rollulus rouloul*) [CITES III]; 0.0.1 Victoria crowned pigeon (*Goura victoria*) [CITES III]. *submitted by Wayne Hazlett, Chapter Liaison, Milwaukee County Zoo AAZK Chapter.*

**Folsom Children's Zoo (Lincoln, NE)**...B&H January-October 1992:

**Mammals** - 1.2.3 Rodriguez fruit bats (*Pteropus rodricensis*) [E/U]; 1.1.2 Pygmy marmoset (*Callithrix pygmaea*) [FCZ history of breeding success]; 0.1 Golden-headed lion tamarin (*Leontopithecus rosalia chrysomelas*) [E/SSP].

**Birds** - 0.0.4 Red-bellied hornbills (*Tokus erythrorhynchus*) [1st time at zoo/1st time from this pair]. *submitted by Debbie Baker, Chapter President, Platte River AAZK Chapter.*

**Zoo Atlanta (Atlanta, GA)**...announces the birth of 0.1 Sumatran orangutan (*Pongo pygmaeus abelii*) [E/SSP] on 4 November. Mother, Sibü, is 38 years old and is the fifth oldest orangutan internationally to give birth. Infant is her seventh baby. *Zoo Atlanta News Release*

**Lion Country Safari (West Palm Beach, FL)**...announce the birth of an as yet unsexed Siamang (*Hylobates syndactylus*) on 15 October [T/1st birth at facility and for this pair]. *Lion Country Safari News Release.*

## **New B&H Format Codes**

1. Endangered (E); Covered by SSP (E/SSP)
2. Threatened (T)
3. Uncommon in Captivity (U)
4. Significant to institution
  - a. (first time birth)
  - b. (first time birth from pair)
  - c. (diet change)
  - d. (husbandry change)
  - e. (exhibit change)
  - f. (other)

When submitting your list, please limit the animals you include to these categories only, and indicate which category each falls under. Each animal listed should include common name, scientific name and should then be followed by appropriate codes. Descriptions under the "significant to institution" category should be kept brief. We hope that those people who wish to expand further on the circumstances surrounding a significant birth or hatch will consider writing an article for AKF. Such articles need not be lengthy, but will allow for more details on significant B&H. We would also encourage the submission of black and white photographs to accompany either B&H submissions or separate articles.

**All material for B&H column must be submitted no later than the 10th of every month.**



## Message from the President....

As 1992 draws to a close, on behalf of the AAZK Board of Directors and Staff, please have a safe and cheerful holiday season.

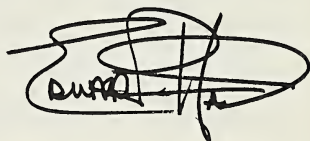
Nineteen-ninety-two has been a very good year for AAZK. We have realized many of our goals enabling the Association to reach the first level of financial stability. The AAZK Board of Directors will work hard during 1993 to continue this trend.

In the January issue of *AKF*, you will receive a short survey regarding your opinion on the goals of AAZK. Please take the time to fill out the survey with your honest opinions of the Association and your ideas for direction.

During 1993, the Board will be working on improving our communication with our sister Associations. Good communication is imperative in attaining a relationship that is mutually beneficial for all concerned. We also anticipate the publication of two long-awaited projects - Zoo Infant Development Notebook and Diet Notebook, Mammals Volume II. The Board will be coordinating development of keeper training and continuing education materials for utilization by interested membership.

The recent Presidential and Congressional elections signal a change on conservation and environmental issues. Please take the opportunity to express your opinion to your newly elected representatives on the Endangered Species Act and other pertinent legislation.

Ed Hansen, AAZK President  
Reid Park Zoo, Tucson, AZ



## AAZK Announces New Professional/Contributing Members

Denise Kaufman, Bronx Zoo (NY)  
Bette Lynne Jorden, Elmwood Park Zoo (PA)  
Geoff Hall, Baltimore Zoo (MD)  
Lynda L. Roberts, Riverbanks Zoo (SC)  
Barry Skwirsk, Lowry Park Zoo (FL)  
Teresa Winiger, Boonville, TN  
Kevin Stalder, Niabi Zoo (IL)  
Ragan Fairchild, Topeka Zoo (KS)  
Barbara Rausch, Sedgwick County Zoo (KS)  
Debora Anderson, Houston Zool. Gdns. (TX)  
Craig Harmon, Cheyenne Mt. Zoo (CO)  
Bob Nightwalker, Cheyenne Mt. Zoo (CO)  
Stephen Yelverton, Cheyenne Mt. Zoo (CO)  
Marla Zimmerman, Cheyenne Mt. Zoo (CO)  
Lane Seyler, Phoenix Zoo (AZ)  
Julia Sweet, Los Angeles Zoo (CA)  
Gretchen Schultz, Sea World of California

Jackson Zee, Central Park Zoo (NY)  
Kristin Hossack, Elmwood Park Zoo (PA)  
Valerie Pruett, Riverbanks Zoo (SC)  
Mickey Wright, Zoo Atlanta (GA)  
Jan Ford, Columbus Zoo (OH)  
Stephen Weaver, Detroit Zoo (MI)  
James Swanson, Rimrock Ranch (WI)  
Tanya Tims, Topeka Zoo (KS)  
Neil Carter, Oklahoma City Zoo (OK)  
Susannah Corona, Sea World of Texas  
Kristine Hassler, Cheyenne Mt. Zoo (CO)  
Karen Wilkinson, Cheyenne Mt. Zoo (CO)  
Vivki Sawyer, Cheyenne Mt. Zoo (CO)  
David Fraser, Cheyenne Mt. Zoo (CO)  
Tara Sprinkle, Phoenix Zoo (AZ)  
Debbie Denton, Sea World of California  
Kristine Lockard, Wildlife Encounters (WA)

Karla Losey, Exotic Feline Breeding Comp. (CA)

### New Contributing Members

Debra G. Wheatley, Brookfield Zoo, Brookfield, IL

### Renewing Contributing Members

Jack Brown, Director, Santa Fe Community College Teaching Zoo, Gainesville, FL  
Steve H. Taylor, Director, Cleveland Metroparks Zoo, Cleveland, OH  
Dickerson Park Zoo, Springfield, MO



# Coming Events

## **Sea World Symposium on Marine Mammals in Florida**

February 6, 1993

Orlando, FL

Will feature presentations by six of Florida's most prominent marine mammal specialists who will discuss the latest scientific findings, research efforts, and management practices affecting Florida's marine mammals. For more information contact the Sea World Education Department at (407) 363-2380. Space is limited.

## **The AAZPA School for Professional Management Development for Zoo and Aquarium Personnel and Applied Zoo and Aquarium Biology**

February 7-11, 1993

Oglebay Park, W. VA

For further information contact: AAZPA, Oglebay Park, Wheeling, WVA 26003-11698.

## **Northern California Herpetological Society's Sixth Conference on the Captive Propagation and Husbandry of Reptiles and Amphibians**

February 13-15, 1993

Davis, CA

All professional and amateur herpetologists are invited to submit for consideration the titles and abstract of papers they wish to present. Send to: Conference Program Committee, Northern California Herpetological Society, P.O. Box 1363, Davis, CA 95617-1363. For more information contact: Rick Staub (707) 553-9739 or Mark Olin (707) 449-6425.

## **Annual Conference of the National Wildlife Rehabilitators Association**

March 3-7, 1993

Sacramento, CA

The University of California at Davis Raptor Center will be hosting the symposium which will feature qualified speakers on rehabilitation, education, administration, veterinary and other topics. Publications of all previous symposia are available and are an excellent tool for persons or organizations interested in this field. Symposium will include hands-on workshops in radiology, parasitology, bandaging and more. For more information contact: MWRA, Carpenter Nature Center, 12805 St. Croix Trail, Hastings, MN 55033 (612) 437-9194.

## **The AAZPA Conservation Academy March 16-20, 1993**

The AAZPA Conservation Academy will offer classes on Studbook I and SSP Coordinator Training. For further information or an application, contact Debra Boyster, AAZPA Conservation Academy, St. Louis Zoo, Forest Park, St. Louis, MO 63110 (314) 781-0900, ext. 297.

## **ARZAPA/ASZK Annual Zoological Conference 1993**

March 29-April 2, 1993

Adelaide, Australia

Joint meeting of the Australasian Association of Zoological Parks and Aquariums and the Australasian Society of Zoo Keepers. This year's theme is "Zoos Enriching Environments". For information contact: Christina Macdonald, Conference Coordinator, Adelaide Zoological Gardens, Frome Rd., Adelaide 500, Australia. Tel: (08) 267-325 Fax: (08) 239 0637.



## **Coming Events, Continued**

### **International Conference on Tortoise & Turtle Conservation**

July 11-17, 1993

New York, NY

Sponsored by the American Museum of Natural History's Turtle Recovery Program and the New York Turtle & Tortoise Society. For further information write to: Craig Vitamenti c/o The New York Turtle Trust & Tortoise Society, 163 Amsterdam Ave., Suite 365, New York, NY 10023 or call (212) 459-4803.

### **14th Association of Avian Veterinarians Conference**

Aug. 31 - Sept. 4, 1993

Nashville, TN

For further information and Paper Criteria, contact: AAV Conference Office, 1625 S. Birch St., Ste. 106, Denver, CO 80222 (303) 756-8380, FAX 303-759-8861.

### **AAZPA 1993 Regional Conferences**

Western Regional Conference (7-9 March, 1993) - for more information contact: Nancy Hollenbeck, Santa Barbara Zoological Gardens, 500 Ninos Dr., Santa Barbara, CA 93103 (805) 962-5339.

Southern Regional Conference (21-23 March 1993) - for more information contact: Fred Antonio or Sandi Tilwick, Central Florida Zoological Park, P.O. Box 470309, Lake Monroe, FL 32747 (407) 323-4450.

Central Regional Conference (4-6 April 1993) - for more information contact: Angela Baier, Sunset Zoological Park, 2333 Oak St., Manhattan, KS 66502 (913) 587-2737.

Great Lakes Regional Conference (18-20 April 1993) - for more information contact: Julene Boe, Lake Superior Zoological Gardens, 7210 Fremont St., Duluth, MN 55807 (218) 624-1502.

Northeastern Regional Conference (2-4 May 1993) - for more information contact: Julia Alarcon-Lorenz, Pittsburgh Zoo, P.O. Box 5250, Pittsburgh, PA 15206 (412) 665-3762.



## **Wildlife Clinic Seeks Health Parameters for Database**

The Wildlife Clinic of Tufts University School of Veterinary Medicine is compiling a database on the health parameters of native wildlife species. We currently have partial information on over 175 species, but we need your help. Although natural history information is readily available, we are having difficulty in finding information in the scientific literature on the hematology and clinical chemistry of many native mammals, birds and herps.

If you have such data in your files, would you consider sharing it with the broader wildlife community? Even if you only have laboratory values for one individual of one species, this constitutes valuable information. We are also interested in finding out about any literature on the subject that you might be familiar with. We will compile all available information and make it widely available. For their participation, anyone contributing data will receive full attribution and a copy of the database.

Once our database is a bit more complete we will make it available to veterinarians, wildlife rehabilitators and wildlife biologists by posting it on electronic networks such as Econet, and making available both hard copy and diskette versions at our cost.

Data can be contributed as hard copy, or on 3½ inch diskettes in any standard word processing format or as ASCII files. Please send data to: **Mark Pokras, DVM, Tufts Wildlife Clinic, 200 Westboro Rd., N. Grafton, MA 01536-1895. tel: 508-839-7918 fax: 508-839-7930.**





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# ZIDP

ZOO INFANT DEVELOPMENT PROJECT



**A.A.Z.K.**  
AMERICAN ASSOCIATION OF ZOOKEEPERS

## ZIDP SAYS, "Hasta La Vista.... Babies!"

Last call for mammal data. BUT, there is still time. Final submission date for the U.S. and Canada is 1 January 1993.

Please contribute ANY information on the following:

Any non-macropod marsupials - the only marsupials we have are macropods.

Any insectivores. Any colugos. Any microchiropteran (echolocating) bats. We have several species of fruit bats.

Chimpanzees! We have some Gorillas and Orangutans, but no Chimps.

We need canids. We only have Red wolf. Any bears info out there? We need raccoons and their relatives; any mustelids; weasel, skunks, etc. Any viverrids, we have none. Civets, mongoose, meerkats. Hyenas, please! More rodents. Tapirs, zebras, onager anybody?

We have a fairly good selection of artiodactyls. We could use more peccaries; more tropical deer species; and more bovids, particularly antelopes.

If you have ANY information on the above, please share it. I'm also still interested in copies of articles containing mammal development.

**CALL FOR VIDEOS:** So many of us have rough video footage on mammal births and development. If you would be willing to share this information with other zoos and keepers, please send the following: **YOU NEED NOT SEND TAPES**

Send species - General content (birth, introduction, etc.)  
Name and address of contact person

These tapes could prove very valuable to institutions expecting births or interested in mixed species introductions, etc. I know Woodland Park has giraffe birth footage, Washington Park in Oregon has elephant birth footage, San Diego Wild Animal Park has Saiga mother/infant interaction footage including nursing!

If you are willing to make arrangements to copy or loan videotapes at the recipient's expense, please send me a note and I will list you in the ZIDP Notebook as a possible contact. **NO OBLIGATION.**

This will serve as one more resource for readers of the ZIDP Notebook. It also gives you a way to share that video footage. You always wondered what you were going to do with it anyway, right?

**AND THANKS TO THE FOLLOWING FOR SENDING INFORMATION:** Dr. Cooper, Calgary Zoo; Pat Thomas for coordinating data from Kathleen MacLaughlin, William Sheshko, Joan McCabe-Parodi, Florence Klecha, Linda Ostro, Gil Gordian and Martin Zybur, all of the Bronx Zoo; Paula Swanson, Santa Barbara Zoo; Tammy Schmidt, Grassmere Wildlife Park; Pam Talbot, Woodland Park Zoo; Sally Petrella, Detroit Zoo; Cindy Thorstad, Zoo Atlanta; Dr. Teare, Milwaukee County Zoo; John Drake, Duke University Primate Center; Joan Ryskamp, John Ball Zoo; the North Carolina Zoo; Lisa Behm, Virginia Zoo; Carrie Bressler, San Diego Zoo; and Lief Cocks, Perth Zoo.

**Bird section is fast on our heels! TIME TO PUT THIS BABY TO BED.....**





## 1992 AAZK CONFERENCE WRAP-UP

The San Diego Chapter of AAZK would like to thank all those dedicated AAZK members who braved the sun and sand to attend the 1992 AAZK National Conference, September 27 - October 2. In all 285 full registered delegates, plus an additional 30 daily registrants, participated in the ambitious six day conference. Those who made it through witnessed many new innovations to AAZK conferences such as:



- \* Concurrent paper and workshop sessions
- \* More workshop time in the program (18.5 hours)
- \* Maximum paper numbers allowable in the program (35 papers)
- \* Abstracts of papers and workshops printed in the program
- \* A professionally solicited and presented poster session
- \* The live auction held on a night of its own (instead of at the final banquet)
- \* More aggressive conference sponsorship solicitation and a record number of auction item donations, 500 +
- \* More commercial exhibitors with professional booth set-ups
- \* Incentive tours; these were a creative attempt to get delegates to register on time. (Please know we understood that there are some people who simply cannot meet registration deadlines because of their work schedules-but we tried!)
- \* And an evaluation form which helped us to determine if the above were appreciated and provided valuable feedback for next year's conference planners

Highlights of the week included the Icebreaker evening cruise of the bay where three of the Founding Fathers of AAZK helped us "Celebrate the Past" and preview the AAZK History book with a book signing. Along with the paper and workshop sessions during the week, the delegates visited three world-class zoological facilities, the San Diego Wild Animal Park, Sea World of California, and the San Diego Zoo. Zoo keepers were treated to each facility's expansive and diverse animal collections and behind-the-scenes opportunities. On a sunny San Diego afternoon, on a sandy beach, the delegates competed in the "Best Of" Zoolympics with a bronze, silver or gold bolus going to the champions.

Thanks to the record participation in the silent and live auctions and special raffles we raised just under \$10,000. A CONFERENCE RECORD! Combining 1/3 of this amount with the \$15 from each fully registered delegate, a total of \$ 7474.07 will be sent to the National AAZK as proceeds from the conference for their operating budget.

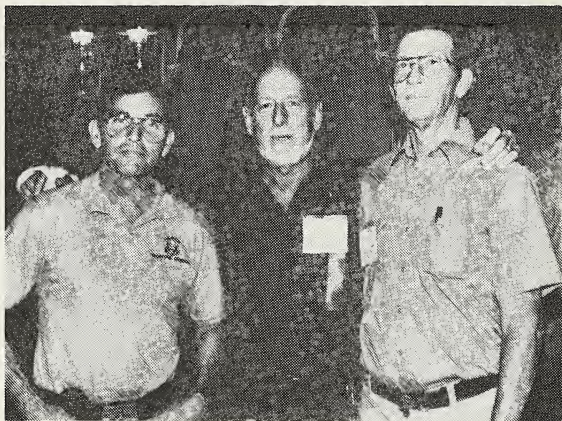
We would like to especially thank all those individuals, corporations, sponsors, donors, and volunteers who helped to make this conference a success. We could not have done it without them!

Sincerely,



San Diego Chapter of AAZK

# SAN DIEGO '92 CONFERENCE



The Ice Breaker, aboard the paddlewheeler, the William D. Evans, was highlighted by the attendance of three of AAZK's Founding Fathers. They helped introduce the AAZK 25th Anniversary History Book at an autographing session. Shown at left are: Conrad Grayson, Ken Willingham and Gerald "Red" Thomas.

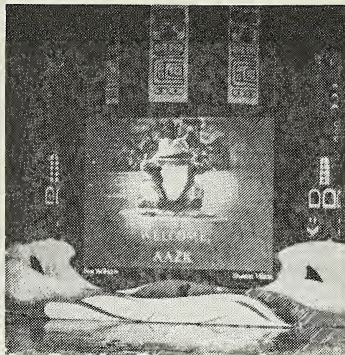
Delegates at the 19th National AAZK Conference had the opportunity to participate in the "Best of the Zoolympics" which featured favorite events from past conferences. Zookeeper teams needed cooperation, stamina and speed to complete this equipment relay.



The busy Conference week schedule included trips to the San Diego Zoo, San Diego Wild Animal Park and Sea World. At left delegates enjoyed a sumptuous buffet supper after their afternoon at Sea World. The evening also included private Seal & Otter and Shamu shows.



## PHOTO MEMORIES



Auctions, both silent and live, are popular events at AAZK Conferences as delegates try to outwit their peers in the bidding process. This year's auctions and special raffles raised nearly \$10,000 - a Conference Record !

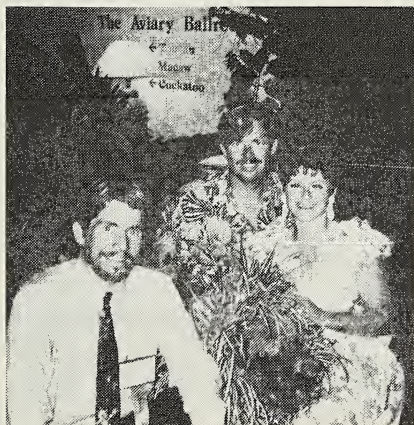


AAZK's trusty mascot "Hozer" showed up at every turn ! At top right he is shown taking center stage on the giant TV screen at the Shamu Show at Sea World. "Hozer" and his cohort "Elvis" also made appearances at the Zoo and Wild Animal Park. A now-Conference tradition, these two party-loving amphibians also welcomed delegates at the Hospitality Room.

Shown above at the final banquet on Friday, the current AAZK Board joined AAZK's Founders for a group photo. Shown are: (standing l to r) Rachel Rogers, Janet McCoy, Ed Hansen, Mark de Denus and Ellen Bradfield; seated from l to r are: Conrad Grayson, Ken Willingham and Gerald "Red" Thomas.

At right Conference Co-Coordinator Steve Castillo, Guy Lichty and Terri Peterson are all smiles at the conclusion of a highly successful week celebrating the 25th Anniversary of the American Association of Zoo Keepers. Congratulations to the San Diego Chapter for a job well done !

*Photos courtesy of the Conference Committee and Susan Chan.*





# 1992 Conference Proceedings Order Form

If you are interested in obtaining a copy of the Proceedings containing the papers presented at the 19th National AAZK Conference held in San Diego, CA, you will need to fill out and return the form below no later than **10 February 1993**. All orders **must** be prepaid in U.S. Funds Only. Allow 4-6 weeks following deadline for receipt of publication. Prices are as follows:

AAZK Member	\$15.00
Non-Member	\$25.00

Postage for U.S. orders is included. Canadian and overseas orders should add \$3.00 for Air Mail postage to Canada and Surface postage elsewhere. Overseas orders wishing Air Mail service should add \$10.00. Make checks payable to AAZK, Inc.

**Note:** Individuals who presented papers at the Conference and submitted a manuscript for inclusion in these Proceedings will receive a gratis copy. If a manuscript was not submitted, a gratis copy will not be sent, and those individuals will need to order a copy.

The following papers are included in these Proceedings: Management of a Bioclimatic Zone at the San Diego Zoo ~ ISIS, Records and Why You Should Be Bothered ~ Keepers + Designers = Exhibits ~ Fundamentals of Security in a Zoological Garden ~ A Keeper's Role at the North Carolina Zoological Park's Hanes Veterinary Medical Center ~ Vitamins and Fish: Which Supplements are Needed? ~ Maintaining A Small Penguin Colony ~ Penguin Perks ~ Clinical Signs and Treatment of an Epidemic in the Penguin Exhibit at the Indianapolis Zoo ~ Breeding and Rearing Efforts with Sergeant Majors at the Indianapolis Zoo ~ Protected Contact Elephant Management ~ Conditioning Incompatible Behavior to Curb Aggression in the Bull Elephant ~ Elephant Management: Wild Animal Habitat's Approach ~ Behavioral Enrichment for Elephants at the Phoenix Zoo ~ Coming Attractions: A Preview of Environmental Enrichment Devices for Captive Mammals ~ Zoos Helping Zoos Save Wildlife, Accomplishing Conservation Goals Together Through the Zoo Conservation Outreach Group ~ Alien Species in an Island Ecosystem ~ The Design, Construction, and Attachment of a Prosthetic Giraffe Tail at the White Oak Conservation Center ~ The Learning and Retention of Animal Adaptations by Children After Participating in Educational Programs Using Animals as Aids ~ Aviculture and the Houston Zoo ~ White Stork Propagation at the Cleveland Metroparks Zoo ~ Puppet Rearing and Foster Parenting of the East African Crowned Crane ~ Captive Behavior of White-backed Mousebirds ~ Hand-Rearing Geoffroy's Marmosets While Keeping Them Within the Family Group ~ Macropod Handraising Protocols at Western Plains Zoo ~ Russian Saiga Neonate Study ~ The History of Mongoose Lemurs at the Philadelphia Zoological Gardens ~ The Early Introduction of a Hand-Reared Orangutan to a Surrogate Mother ~ and Primate Hand-Rearing Procedures and Enrichment Techniques at the San Diego Wild Animal Park. WORKSHOP SYNOPSIS/MATERIALS included are: Australasian Rap Session ~ Zoonoses - How to Protect Yourself and Reduce Risks of Infection ~ Create Your Own Rocks/Exhibit Construction Techniques With Cement ~ What Do We Think, What Do We Say, What Do We Do? Ethical Issues, Guidelines and Actions for Zoo Professionals ~ The Keeper as Teacher - How to Survive Zoo Camp ~ Bowling for Rhinos ~ Enrichment Made Fun and Easy and AAZK Chapter Officers Workshop. Also special lecture "The National Fish and Wildlife Forensics Laboratory" by Rhoda M. Ralston, DVM, USFWS Forensics Lab.

**Feel free to photocopy the form on the adjoining page to place your order.**

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# Proceedings Order Form

(PLEASE TYPE OR PRINT)

I wish to order \_\_\_\_\_ copy(s) of the 1992 San Diego Conference Proceedings.

# of copies x price per copy = \$\_\_\_\_\_ Additional postage (if applicable) is \$\_\_\_\_\_

Total payment for this order is \$\_\_\_\_\_ (make checks/money orders payable to AAZK)

My check is enclosed \_\_\_\_\_ Please charge to my VISA or MASTERCARD (circle)

Card # \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Expiration date: \_\_\_\_\_

Signature \_\_\_\_\_

Please mail to me at address given below:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_

Country \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_

Send this Order Form along with check or money order or payment authorization via credit card to: AAZK Conference Proceedings, 635 S.W. Gage Blvd., Topeka, KS 66606.

**ORDERS MUST BE RECEIVED BY 10 FEBRUARY 1993**

Proceedings are only available by sending in your order form now. Once the initial printing is done, complete sets of Proceedings will no longer be available. After the deadline, only individual copies of papers will be available at \$2.00 each. So ORDER NOW!

# ATTENTION ALL AAZK MEMBERS

If you were not able to attend the 1992 National Conference in San Diego and are interested in either a Conference T-shirt or Tote Bag, there is still a chance to purchase these items. The T-shirt is ash-colored, pre-shrunk cotton with the 25th Anniversary Conference logo in three colors on the front. The Tote Bag is made of sand-color canvas with handles, and has the three-color conference logo on one side. To order, please fill out the following information and send with check or money order (U.S. funds only) payable to "1992 AAZK Conference" to : San Diego AAZK Chapter, P.O. Box 551, San Diego, CA 92112. Thank you.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_

COST PER T-SHIRT INCLUDING SHIPPING IS \$13.00

COST PER TOTE BAG INCLUDING SHIPPING IS \$5.00

T-SHIRT: \$13.00

QUANTITY AND SIZE

MEDIUM: \_\_\_\_\_

LARGE: \_\_\_\_\_

EXTRA LARGE: \_\_\_\_\_

TOTE BAG: \$5.00

QUANTITY: \_\_\_\_\_

TOTAL: \$ \_\_\_\_\_





# University of Wisconsin-Stevens Point Offers Four-Year Captive Wildlife Management Program



*submitted by Kent D. Hall, Ph.D.*

*Professor/CWM Intern and Professional Development Coordinator*

The University of Wisconsin at Stevens Point has established a four-year program in Captive Wildlife Management. It is now entering its 4th year and is a cooperative venture between the College of Natural Resources and the Department of Biology. Strictly for undergraduates, it has four major training components: 1) Zookeeping, 2) Zoo-Education, 3) Exotic Animal Veterinary Medicine, and 4) Research with exotic animals and North American wildlife.

Basic to the success of the program has been the outstanding cooperation of captive wildlife facilities. To date we have cooperative working agreements with 79 captive wildlife facilities, 44 of which are AAZPA-accredited zoos and aquariums. For the year ending on 31 August 1992, 99 different students at UW-SP participated in 144 different captive wildlife experiences. The majority of our experiences occur in January (2-3 week interim) or the summer. We are fortunate to have over 20 captive wildlife facilities in Wisconsin that work with our students. These include the AAZPA-accredited institutions: Milwaukee County Zoo, the Racine Zoo, Henry Vilas Zoo, and the International Crane Foundation. UW-SP is also the only four-year school in Wisconsin (out of 37) that has a wildlife rehabilitation facility closely affiliated with it (the Central Wisconsin Wildlife Rehabilitation Center; nearly 600 patients in its 2nd year of operation).

Traditionally, UW-SP has been a mecca for training students in classical wildlife management. Currently, there are over 600 students here who are majoring in some field of wildlife. The fastest growing field, however, is that of Captive Wildlife Management. Currently, we have 78 students who are taking this curriculum emphasis. Anyone who would like to learn more about the program can send for a synopsis of the program from: Kent D. Hall, Ph.D., Coordinator of CWM Interns, Department of Biology, University of Wisconsin-Stevens Point, Stevens Point, WI 54481 (Voice Mail at: (715) 346-4251).



## Information Please

Duke University Primate Center requests any information on Warblefly/Botfly larval infestation in semi-freeranging animals. If particular interest are preventative measures. Please send any information to: John Drake, Duke University Primate Center, 3705 Erwin Road, Box 90385, Durham, NC 27705.

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Dr. Herbert Schifter (Naturhistorisches Museum Wien), Marvin Jones (San Diego Zoological Society) and the undersigned are currently preparing a series of papers on longevity in birds. We would be very interested in receiving any data available on this subject from the readers of this magazine. Information on longevity of both captive and wild birds is welcome. Please include exact dates of arrival, birth and death if these are available. Post mortem reports would also be appreciated. Please also include data on the last age of reproduction if this is known.

Acknowledgments will include name of individuals and institutions that provided us with data. An article on longevity and reproduction of storks has been accepted for publication in the International Zoo Yearbook and will be the first in a comprehensive series. Papers on longevity in ibises, spoonbills and hornbills are currently in preparation.

Send any data to: Dr. Koen Brouwer, National Foundation for Research in Zoological Gardens/EEP Executive Office, c/o Amsterdam Zoo, P.O. Box 20164, 1000 HD Amsterdam, The Netherlands. Tel: + 31 20 620 74 76 Fax: + 31 20 625 39 31.



# Chapter News

## Zoo Atlanta AAZK Chapter

In June the Atlanta AAZK Chapter had our annual Bowling for Rhinos fundraiser. We had a good turnout and the event raised over \$5000.00 for Ngare Sergoi Rhino Sanctuary.

The Chapter was represented at the National AAZK Conference in San Diego by two members, one of whom was sponsored by the Chapter. The San Diego Chapter really showed us how a conference should be done! We had a great time, took a lot of information back to our institution, and met some wonderful people.

Fundraising and planning continues for the 1993 AAZK National Conference which will be hosted by our Chapter. Co-Chairs Ellen Bradfield, Charles Horton and Brian Russell, along with fundraising committee co-chairs Barbara Webb and Cary Burgess, are busily preparing for the hectic year ahead.

Recent money-makers have included our annual haunted house, and our ongoing wishing well and recycling projects.

We would like to wish good luck to Heidi Forest, a long-time active Chapter member, who has left us this fall. We would also like to extend a warm welcome to Mark Costello, Stephanie Forbee, and Mickey Wright who recently joined our keeper staff at Zoo Atlanta.

--Michelle Schireman, Chapter Liaison

## Jacksonville Chapter AAZK

The Chapter announces that Michelle Corcoran, who has served as President since May of 1991, has resigned her position due to a career move to Zoo Atlanta. New officers for the Chapter are:

President/Chapter Liaison..Glenn Wood  
Vice Pres/Sec'y.....Jennifer Gerez  
Treasurer.....Ann Hinton

## Utah Chapter AAZK

Although it has been awhile since anything was written about Hogle Zoo, the Utah Chapter has been far from idle! The officers elected for 1992 are:

President.....Mary Wykstra-Ross  
(Exhibits Dept.)  
Vice Pres.....Terry Griffith  
(Animal Care staff)  
Secretary.....Cindy Jensen  
(Society Membership Sec'y)  
Treasurer.....Joyce Lingman  
(Marketing Dept.)  
Docent Liaison...Matt Applington  
(Discovery Land Docent)  
Chapter Liaison...Gina Phillips  
(Animal Care staff)

In 1992 our local AAZK Chapter collected over \$1000 from Bowling for Rhinos. We plan to collect at least that much next year, and hope to collect more.

For the second year we have adopted a stretch of highway near the zoo. Despite sunburns, aching backs, sore feet, and insect bites, we feel it reflects a positive image to our association, and plan to continue our adoption.



Our "Zoo Keeper For A Day" program is a lot of fun for everyone; the keepers enjoy it as much as the kids do! When a child is selected, he/she spends the day with pre-chosen keepers. They have many photographs taken and we mail them to the kids. We use this program as a fundraiser. We have used donations as a means of collecting money, and have also allowed the program to be auctioned.



## Chapter News, Continued

Our involvement with Ecosystem Survival Plan has been rewarding! We purchased a Conservation Parking Meter and held a press conference to unveil it in April. Of course, it is located in the tropical rainforest in our Small Animal Building, and the project is overseen by Jane Larsen and Amanda Barth, the President and Vice President of 1991.

Our resident artist, Jay Weston, designed postcards and stationery for us to sell this year. We hope to raise enough funds to cover the cost of increasing our library with books and information pertinent to our members.

This year the Utah Chapter was well represented at the conference in San Diego. With deep gratitude to the staff remaining behind, eight of us flew to sunny California to bask in sunshine and soak up knowledge to bring back and share with our co-workers at home. All of us came back with renewed appreciation for our jobs, great ideas we are eager to try, and the knowledge that there are hundreds of other people just like us, who have made zoo keeping as a profession something to be proud of.

--Gina Phillips, Chapter Liaison

### Philadelphia AAZK Chapter

Officers for 1992 are:

President.....Teri Maas  
Vice President.....Todd Sinander  
Treasurer.....Joanne Adams  
Secretary.....Chris Carbone  
Chapter Liaison.....Deborah Wainright

This year our Chapter has been involved in several international conservation projects as well as our continued involvement with zoo-related activities. Our "Keeping Up with the Keepers" and "Keeper Evening" programs for zoo members remains a very popular event.

In April our Chapter held a used book sale to raise funds for the Chimfunshi Chimpanzee Reserve in Gambia, Africa. Organized by Maggie Liguori, the fundraiser was a huge success. We raised \$500.00 for the chimps.

This year our Bowling for Rhinos was held in July. Eighty-three bowlers participated and \$5700.00 was raised. Several local merchants donated prizes which were given out throughout the evening for high scores, highest money raised and strikes.

We are continuing to help the Minerva Zoo in Guatemala by sending them photos of exhibits, books, uniforms, ideas for environmental enrichment, and various pieces of animal handling equipment. We also donated funds to the L'Aurora Zoo in Guatemala to help pay for a teacher so that keepers there can learn English and eventually travel to U.S. zoos for further study.

Our Conservation Parking Meter has raised about \$3400.00 for the Adopt-an-Acre program, and we're now donating the money from our view finders to The Nature Conservancy Delaware Project which concentrates on local conservation efforts.

In October, several AAZK members participated in a sign language course that was geared toward zoo-related communication. The Zoo sponsored a Deaf Awareness Day and keepers did talks in sign language.

This year has seen an increase in the number of keepers attending various conferences, including the Gorilla Workshop, Animal Behavior Society Conference, both the AAZPA and AAZK Conferences. Our Chapter has generously donated partial funding for keepers to attend these conferences.

--Deborah Wainright, Chapter Liaison

### Milwaukee County Zoo AAZK Chapter

The last of our planned bird nestboxes have been completed, thanks to Bob Jackson of Zoo Pride. They will be installed on the zoo grounds this fall, weather permitting.

Two of our Chapter officers, Craig Berg and Cyd Mayer, attended the National Conference in San Diego. They also attended the meeting of the Great Lakes Regional Council on 28 September. The last meeting of the year is always held



## Chapter News, Continued

during the conference. Craig Berg, Chapter President, volunteered to come up with a strategy to help the keepers at the Miami Metrozoo that would not compromise the AAZK nonprofit status. Chapters in the region showed interest in helping our brothers and sisters devastated this past summer by Hurricane Andrew.

Our Chapter's annual Spaghetti Dinner was held on 18 October with the largest attendance ever. A meat sauce, and also a vegetarian sauce was prepared again by Chef Wayne. He was helped by Craig, Diane, Jackie, Lois, Sue and Toni. One

hundred and four people were served. The support from the Milwaukee County Zoo, Zoo Pride, Zoological Society and all their staff was gratifying. Alice Miser and a friend were down from Baraboo (Ochsner Park Zoo). We are always happy to see Alice, formerly of the Topeka Zoo, and now the Zoo Specialist at Park Zoo. This annual event is our main fundraiser and the Chapter really appreciates all the support that we receive.

All the Chapter members are now looking forward to our Christmas Party.

--Wayne Hazlett, Chapter Liaison



## Keepers' Alert

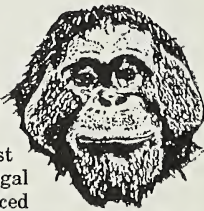
AAZK member Bob F. Pierson has notified AO that he has filmed for the first time ever the breeding, nesting, egg laying, and nest protecting behavior of the Savannah Monitor (*Varanus exanthematicus*) in captivity. If any zoos housing this species are interested in corresponding with Bob on this, he may be contacted at: Bob F. Pierson, Las Vegas Reptile, 2974 Liberty Ave., Las Vegas, NV 89121.

## Orangutan Foundation International Seeks Help to Build Veterinary Hospital

The only natural habitat for the endangered orangutan is the rainforest of Sumatra and Borneo in Indonesia. Due to forest cutting and the illegal pet trade of young orangutans, there is now an abundance of displaced orangutans. After three years of age it is nearly impossible for a private individual to house or cage a growing orangutan. As these former pet orangutans mature, they become homeless orphans with no place to go.

For 22 years, Dr. Birute Galdikas has nurtured and rehabilitated orphan orangutans to release back to the wild in Tanjung Puting National Park in Borneo. This rehabilitation process can take as long as eight years as the animals must be taught foraging, climbing and nest building skills. Many orphan orangutans are sick and malnourished when they enter the nursery at the reserve. A full-time veterinary team provides proper medication and nursing care. Antibiotics and intravenous fluids are often administered to save an infant's life. Dr. Galdikas' program of proper diet, vaccinations and deworming help prevent many diseases.

The OFI has proposed the construction of a new facility to include a treatment room, surgery room, x-ray and developing room, record keeping area, large quarantine area, infant intensive care area, and hospitalization room. In addition the nursery and veterinary hospital need maintenance and upgrading on an annual basis. Therefore the OFI is seeking donations to make this facility and its operation a reality. Donations in any amount are greatly appreciated. Examples of costs at the facility include: \$10 feeds an infant for a month; \$50 for diagnosis and medication for an infant with pneumonia; \$250 vaccinates and deworms an infant for one year; \$500 will feed, vaccinate and medicate an infant for six months; \$1000 will feed, vaccinate and medicate an infant for one year. All contributions are tax-deductible and may be made payable to: O.F.I. Orangutan Nursery/Hospital and sent to: Orangutan Foundation International, 822 S. Wellesley Ave., Los Angeles, CA 90049.



# ELECTION.....'93

**WE WANT YOU!** Do you wish to help your professional organization? Become an AAZK Board Member. Two seats are up for election - those held by Ed Hansen and Janet McCoy, whose terms expire on 31 December 1993. New board members will serve a four-year term from 1 January 1994 through 31 December 1997. Why is this first call for nominations so early? **TIME** is the answer. Nominations, candidates verification and tallying mailed ballots require time. We also wish to notify winners early enough to allow them to make arrangements to attend the National AAZK Conference **before** they assume office the following January. This will enable the new Board Members to become familiar with Board responsibilities and AAZK activities before they assume responsibility for our organization.

## Duties of the Board of Directors

For a more detailed explanation of the expanded duties of the Board, refer to the By-Laws (available upon request from Administrative Offices in Topeka, KS).

- 1) Select, appoint or remove officers, committees, agents and employees of the Association, including prescribing powers and duties.
- 2) To control and manage the Association and its property, passing upon acquisition and disbursements with approval of a majority of the Board.
- 3) To formulate policies, rules and regulations in accord with the Constitution & By-Laws.
- 4) To uphold the Constitution of AAZK and the policies of the Association.
- 5) To appear at Board meetings, to accept Board assignments and to devote the time to communications pertinent to all Board business, including answering correspondence promptly and efficiently.

## Qualifications for Nomination

- 1) Nominee must be a Professional Member of AAZK and must have been a member of the Association for at least one year.
- 2) Nominee must be presently employed as an animal keeper/attendant by a recognized zoological institution or aquarium in the U.S. or Canada and must have been in the zoological field for at least two years.

## Nomination Procedure

- 1) Nominator Form:
  - a. List the name of the nominee, phone, address, and institution.
  - b) State in 150 words or less the reason(s) why the nominee warrants election to the Board of Directors.
  - c) Nominator signs forms and mails to NEC Chairperson.
  - d) Notifies nominee that they nominated him/her for the Board.
- 2) Nominee Biographical Form:
  - a) Professional background: places of employment, length of service, titles.
  - b) Membership in AAZK: National and local chapters, number of years, offices held, involvement in activities.
  - c) Educational background.
  - d) Membership in Affiliate Organizations: (AAZPA, Audubon, etc.)
  - e) State in 500 words or less why you would like to be on the BOD and any other pertinent information. (optional)
  - f) References (one or two)
  - g) Nominee signs forms and mails to NEC Chairperson.

**NOTE:** Candidate is ineligible for nomination if **both** the nominator and nominee biographical **forms** are not **complete** and **returned** to the NEC Chairperson **by 31 January 1993**. Send completed forms to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.

# **Nomination Form for** **AAZK Board of Directors**

## **Qualifications for Nomination:**

- 1) Nominee must be a Professional Member of AAZK and must have been a member of the Association for at least one year.
- 2) Nominee must be presently employed as an animal keeper/attendant by a recognized zoological institution or aquarium in the U.S. or Canada and must have been in the zoological field for at least two years.

1. Name of Nominee: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Institution: \_\_\_\_\_

Director: \_\_\_\_\_

2. State in 150 words or less the reason(s) why the nominee warrants election to the AAZK Board of Directors.

3. Signature of Nominator: \_\_\_\_\_

4. Form must be received by the NEC Chairperson by 31 January 1993.  
Send to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.



**Nominee Biographical Form**  
**for AAZK Board of Directors**

(To be completed by Nominee)

1. Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

**PLEASE LIST THE FOLLOWING INFORMATION**

2. Professional Background: (places of employment, length of service, titles)

3. Membership in AAZK:

a) National: number of years \_\_\_\_\_

Activities:

b) Local Chapter(s): number of years, offices held, involvement in activities.

**4. Educational Background:**

**5. Memberships in Affiliate Organizations: (AAZPA, Audubon, WWF, etc.)**

**6. State in 500 words or less why you would like to be on the BOD and any other pertinent information. (optional)**

**7. References (one or two): gave name, address and phone number where they can be reached:**

**8. Nominee's Signature:\_\_\_\_\_**

**9. Form must be received by NEC Chair by 31 January 1993. Send form to: Mike Light, Wild Animal Habitat, Kings Island, Kings Island, OH 45034.**

# Still hanging on!



## MIAMI METRO ZOO

"Hurricane Andrew"

August 24, 1992

On behalf of the keepers at Miami Metro Zoo, I would like to thank everyone who has helped us in our efforts to survive Hurricane Andrew's aftermath and begin the process of rebuilding. Many goods have been received and much help offered. For these things we thank you very much, and because of your generous support, we ARE rebuilding!

One of our keepers (Antonio Flores) has designed a T-shirt illustrating this. We would like to offer these to you for \$12.00 each which includes postage. All profits will go to a fund to help the keepers who suffered personal losses from Hurricane Andrew. Whenever possible, please order as a whole Chapter or Zoo. This would save us a great deal of confusion (we have a lot of that down here already!). Thanks again! We're still hanging on!

Sincerely,

*Barbara Palmer*

*Primate Keeper Miami Metro Zoo*

Hurricane Andrew T-shirts are available in Medium and X-Large sizes only. Color choices are: Coral, Green, Yellow, Grey and Blue. Checks or Money Orders should be made payable to "Keeper Relief" (U.S. Funds ONLY). Send orders to: Walter Dupree, c/o Miami Metro Zoo, 12400 S.W. 152nd St., Miami, FL 33177. Be sure to include: (1) total number of shirts in your order, (2) color and size choice for each shirt ordered, (3) your complete mailing address, (4) check or money order. **ORDERS WILL BE TAKEN UNTIL 15 JANUARY 1993.**



# Viewpoint

By C. Tromborg  
and G. Mitchell  
Univ. of CA, Davis

Response to counter-viewpoint  
on "You Learn What You Eat"  
from October 1992 AKF.

## "Zoo Food Feud"

In the October, 1992 issue of AKF, Mr. Eric Sampson wrote a rebuttal to our proposal entitled "You Learn What You Eat", published in the August 1992 issue of AKF. This short communication is offered as a response, not a rebuttal to Mr. Sampson's letter.

Our contention that zoos persist in sending incomplete and mixed messages to their patrons is a sincere one. We are concerned that our point has been somewhat trivialized. Consequently, we wish to address below several of the points offered by Mr. Sampson.

Our first problem is with Mr. Sampson's statement that asking zoos to squeeze a meaningful conservation message into their food is asking a bit too much. This assertion is simply untrue. Our proposal envisioned offering relatively healthy, natural foods to the public whenever possible. We further advocated attempting to offer some items of food similar to those consumed by some animals. Neither of these arrangements is capital intensive. Serving nuts and dry fruit at various locations around the zoo grounds is no more difficult than offering pink popcorn through the same facilities. Nowhere did we advocate printing "trivia" on napkins or cups. If anything, conservation messages should not be trivialized.

The second point made by Sampson is that modern zoos must compete with movies, computer games, and television for an ever shortening public attention span. It is our contention that zoos are qualitatively different than these distractions. A truly modern zoo should not be competing with any of these other features of the modern world, but rather should complement them. To the extent that zoos emphasize entertainment and leisure over legitimate educational and emotionally important experiences, they resemble the zoos of old. We are not missing the point by suggesting that zoos must diminish tendencies to entertain their visitors, at least in the traditional sense. Entertainment should be facilitated by immersing the public in as many aspects of nature as is possible. Entertainment need not involve trivial phenomena, reminiscent of carnivals. If this is the type of amusement that the public desires, then they are probably well served by observing agitated animals behaving abnormally.

Another point made by Mr. Sampson is that we might be overestimating the gains that might be made by replacing commonly available zoo fare. Our first response is that there are no empirical data with which to make any statements about the possible effectiveness of these procedures. The second response is that the zoo experience should be a total one. Zoos should embrace every available opportunity to convey information to their visitors. To the extent that foods reminiscent of those consumed by animals assist in the development of empathy or increased understanding toward other species, then these procedures will be successful.

One point that was not addressed in Mr. Sampson's rebuttal of our paper is that zoo visitors must be reminded of the sources of some food items. The primary goal of reminding the public about the origin of some foods is to suggest that agricultural activities are often very important causal factors in the decline of some animal populations.

Another point that must be addressed is the suggestion that imitation foods are somehow intrinsically more "fun" than natural foods. We are unaware of any data supporting this assumption. To suggest that healthier foods will somehow diminish the zoo experience is probably a spurious argument. What will be diminished is a tradition of serving zoo fare more characteristic of the midway than of the evolving zoological parkway. We are not suggesting a radical dietary change. What is so unusual about orange juice or peanuts?

## **Viewpoint**, continued

Sampson comments that people attend the zoo to experience the dependable. This is patently untrue. Most zoo visitors are seeking an arousing, novel experience. Junk food bribes are plenty of trouble and are already employed excessively in the home. They certainly do not belong in a living museum.

Zoos are real institutions, they feature real animals that increasingly engage in real behavior, and they should serve real food. People will continue to visit zoos even if they emphasize more naturalistic food, perhaps even more because they do so. This will occur primarily because they will become bored with their movies, television and computer games. Perhaps these are the things best paired with the consumption of hot dogs, snow cones, and, might we add, beer and cigarettes.

*The Viewpoint Column is made available for the discussion of opinions pertinent to all aspects of zoos and zookeeping. Publication of reader's opinions does not imply endorsement on the part of AKF or AAZK, nor do opinions expressed herein necessarily reflect those of AKF or AAZK. The AAZK Board of Directors and the AKF editorial staff reserve the right to determine the appropriateness of articles submitted for this column.*



## **AAZPA Awards Presented at Toronto Meeting**

The following awards were presented to member institutions during the 1992 National Conference of the American Association of Zoological Parks and Aquariums (AAZPA):



### **Edward H. Bean Awards**

New York Aquarium - Breeding Program for Beluga Whale  
Gladys Porter Zoo - Breeding Program for Phillipine Crocodile

#### *Significant Achievement Awards*

Memphis Zoological Garden & Aquarium - Long-term Propagation Program for  
Jambu Fruit Dove  
New York Zoological Society/Wildlife Survival Center - Long-term Cooperative  
Propagation Program for Jackson's Hartebeest  
San Antonio Zoological Garden & Aquarium - Long-term Propagation Program  
for Jackson's Hartebeest  
Sea World of California - Birth of a Black-tipped Reef Shark

### **Education Award**

Los Angeles Zoo - Zoo Discovery Kit

#### *Significant Achievement Award*

Minnesota Zoological Garden - Earth Voice: Citizen Stewardship and  
Education Program

### **Exhibit Award**

John G. Shedd Aquarium - Oceanarium

#### *Significant Achievement Awards*

Caldwell Zoo - East African Exhibit - Phase III  
Dallas Zoo - Jake L. Harmon Gorilla Conservation and Research Center  
San Diego Zoo - Gorilla Tropics



# Four Years of Hummingbird Breeding at the Arizona-Sonora Desert Museum

By

Karen Krebs, Dept. of Mammalogy & Ornithology  
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In October 1988, the Arizona-Sonora Desert Museum opened its new Hummingbirds of the Sonoran Desert Region Exhibit. It is a walk-through aviary which quickly became one of the more exciting and popular exhibits at the museum. Ten species of hummingbirds live within this outdoor exhibit. Two species of hummingbirds have bred and 36 eggs have hatched in the hummingbird exhibit over the past four years. Breeding hummingbirds in captivity is difficult and unusual. According to ISIS S.D.R. Abstract, the only hummingbirds hatched in a North American zoo were at the Arizona-Sonora Desert Museum during 1989, 1990, and 1991.

The Arizona-Sonora Desert Museum's hummingbird exhibit is an outdoor aviary approximately 162m<sup>2</sup> (1800 sq. ft.) with a height of 300cm (10 ft.). The shape of the exhibit is irregular (Fig. 1) to allow more hummingbirds to exist within the aviary. This particular shape allows the birds to set up individual territories. The Desert Museum's hummingbird was described by Palmer, Krebs, and McLalan (1989). Many perches and feeders are distributed throughout the exhibit at varying heights and locations. Reed matting and tarps provide shade in the summer and protection from the elements in the winter. Almost all the trees, shrubs, and herbaceous plants within the exhibit grow naturally in the Sonoran Desert region. A commercial hummingbird food, Nektar-Plus® is offered in the feeders and these are changed 2-3 times a day. There are 35 feeders distributed around the exhibit at varying heights and locations. Fruit flies (*Drosophila*) are provided daily for the birds.

All ten species of hummingbirds within the exhibit are indigenous to the Sonoran Desert region. Most of these species breed in this region at one time or another during the year. The entire exhibit houses 28 individual birds. Originally all birds were wild-caught as adults for the exhibit. The walk-through aviary contains Broad-billed (*Cynanthus latirostris*), Costa's (*Calypte costae*), Anna's (*Calypte anna*), Black-chinned (*Archilochus alexandri*), Broad-tailed (*Selasphorus platycercus*), Calliope (*Stellula calliope*), and Lucifer (*Calothorax lucifer*) hummingbirds.

There are male and female for all of these species. Three individual flight cages within the exhibit house one bird each. These birds are the Blue-throated (*Lampornis clemenciae*), the Magnificent (*Eugenes fulgens*), and the Rufous (*Selasphorus rufus*) hummingbirds. These birds are either larger or more aggressive species and all are males.

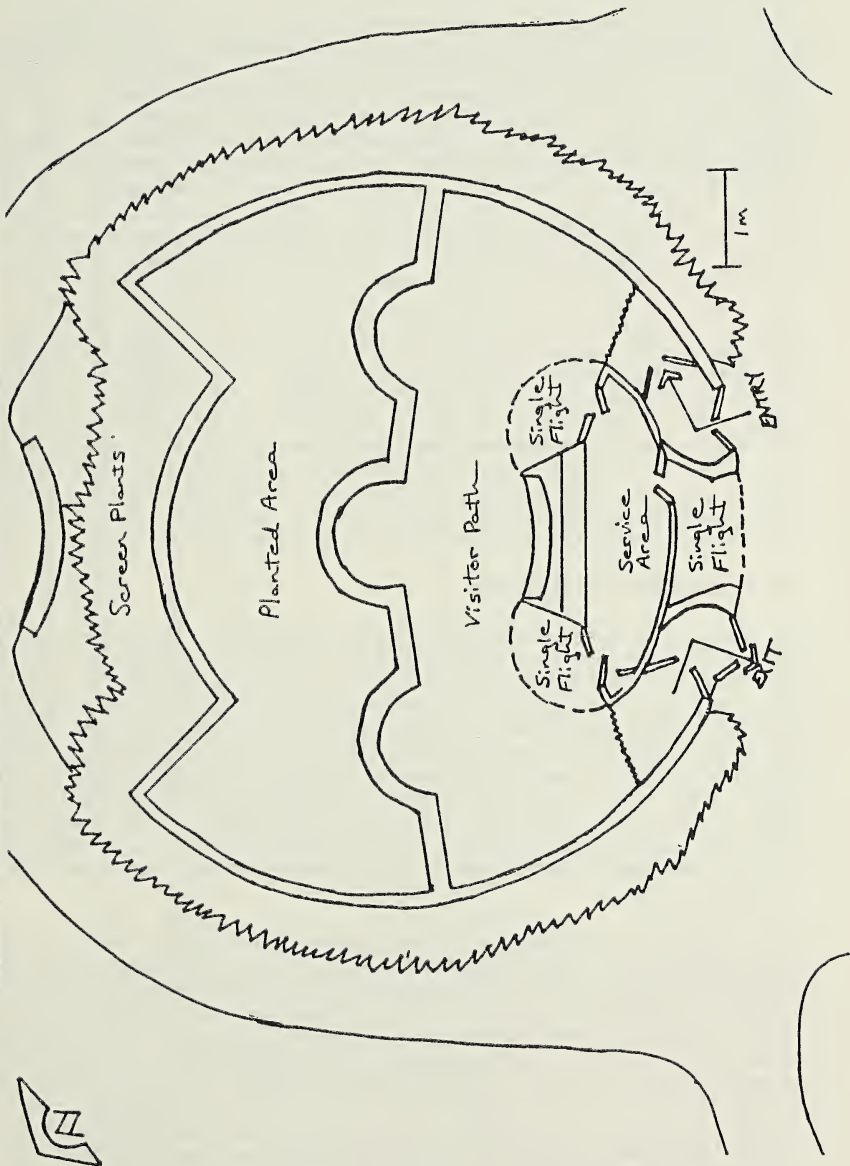
## Nesting

When the female hummingbirds in the exhibit start building their nests they hover around bushes, trees, and visitors looking for nesting material. They approach visitors searching for hair, strings, and sweater yarn to use in their nests. This is a very exciting time for the visitors as the hummingbirds come very close to them. At this time keepers put out a variety of nesting material. We have provided animal hair, plant down, cotton, lamb's wool, feathers, clothes dryer lint, paper towel and kleenex strips, bark, moss, and spider webbing for the birds to use when constructing their nests. Each bird has its own individual preferences but all of the nesting material types have been used at one time or another.

The female hummingbird does all the nest building, incubation, and caring for the young. The only role the male hummingbird plays is in copulation. The nesting material is carried in the bill of the female to the branch or platform on which she is building the nest. All but one of the nests built in the exhibit have been built in trees and bushes. The



Figure 1. Floor plan of the Arizona-Sonora Desert Museum Hummingbird Exhibit.



## **Four Years of Hummingbird Breeding at ASDM.** *Continued*

exception was built on the top of the ribs of the skeleton of a saguaro cactus that surrounds a support beam in the exhibit. This nest was built within inches of the top of the exhibit. The female uses her long needle-like bill to weave the nesting material together to form a cup-shaped nest. She stomps down the nesting material on the inside of the nest with her feet and molds it to her body. She uses spider webbing to hold the nest together. The exteriors of the nests are decorated with leaves, flowers, bark, string, and whatever else the birds can get from the visitors within the exhibit.

One of our birds built a nest in as short a time as four days (Table 1), and another bird took 37 days to complete hers. Nests have been built all over the exhibit. Some nests are built as close as several feet from where the visitors stand, much to our dismay. The female hummingbirds and their young do tolerate cameras, flashbulbs, and people well. Each species of hummingbird has a distinctive nest, and this is obvious with our birds. Even individual birds within a species have particular nest styles, and the birds can be matched with their nests within the exhibit. Some of our inexperienced birds have to build several nests before they construct one that holds the eggs and themselves adequately. Even some of our older birds at times have built sloppy nests. Some of these nests are successful and some are not. All nests, good or bad, are left in the exhibit after the nesting season, because some nests are reused or the materials in them are used to build a new nest. We had a Broad-billed hummingbird reuse a nest in 1992 which she had built three years earlier.

This same Broad-billed hummingbird was the first bird to build a nest in our hummingbird exhibit and she built her nest five months after the opening of the exhibit. She laid one clutch and successfully raised one fledgling. The following year she reused the same nest for her first clutch and raised two fledglings. For her nest building this bird liked the white and gray poodle hair that we collected from a local dog groomer. In 1990 (Table 1) a Costa's hummingbird also bred in the hummingbird exhibit. To date we have had two species and 10 individual birds build nests, breed, and successfully raise their young in our hummingbird exhibit. This includes breeding by first and second generation captive-raised individuals. We have never had to intervene and hand-raise any of the young hummingbirds. Our birds are excellent mothers.

### **Courtship, Displays and Copulations**

Many wild male hummingbirds perform aerial dive displays during courtship to attract females. The male does a series of U-shaped or oval-shaped dives. These dives are directed toward a female sitting close by. The males orient themselves with the sun so that their gorget colors are at their best. The male usually does these dives from a considerable height. Up until a year ago I had never seen any of our birds do the dives and assumed the height of the exhibit made it impossible for the birds to do so. In 1991 our male Calliope began courtship diving to our female Calliope. He would fly to the top of the exhibit and dive to within inches of the floor. When the female Calliope tired of these displays the male would dive to any female he could find. He even dived to no birds at all. The dives were always spectacular and if the females were not impressed, I definitely was. Since then I have seen our male Black-chinned and Broad-tailed hummingbirds dive in the hummingbird exhibit.

All the copulations I have observed within the hummingbird exhibit have been between Costa's hummingbirds. The male approaches the perched female and begins the encounter with what is called a "shuttle-flight" display. During this he flies back and forth horizontally in front of the female with his gorget feathers flared and the tail spread. These "shuttle-flights" are accompanied by species-specific sounds, song in some species and wing strokes in others and they are highly species-specific in terms of rate, direction, and amplitude of the "shuttle" (Johnsgard, 1983). The female will either fly away and be chased by the male or she will fly out to confront him. The male and female face-off by hovering bill to bill while they circle around each other. These face-off encounters usually end up in fights and it is not unusual to see the two birds in combat rolling around on the ground. If the female is ready to breed she will break away from the fight and land on a low perch. She then assumes a copulatory position and the male lands on her back. The

Table 1.  
Hummingbird  
nesting data at  
the Arizona-Sonora  
Desert Museum from  
1989 to 1992.

Table 1. Hummingbird nesting data at the Arizona-Sonora Desert Museum from 1989 to 1992.	Year/Species							
	1989		1990		1991		1992	
	Broad- billed	Costa's	Broad- billed	Costa's	Broad- billed	Costa's	Broad- billed	Costa's
Nesting birds (#)	1	1	1	1	2	4	1	5
Complete Nests Built (#)	1	1	1	1	3	9	-	8
Time taken to Complete Nest (days)	18	10	4		4-10	4-37	3-5	5-15
Clutches (#)	1	2	2		3	11	2	10
Eggs Laid (#)	2	4	1		6	19	0	20
Eggs Hatched (#)	1	4	1		3	12	2	10
Incubation Period (days)	15	15	15		15	15	15	15
Nestling Period (days)	24	22-24	21-26		24-25	21-24	-	21-37
Fledglings (#)	1	4	1		3	12	0	9
Fledgling Sex Ratio (M/F)	1/0	2/2	1/3		2/1	2/8	-	6/3
Post Fledgling Care (days)	22	16-26	7-26		14-18	10-23	-	10-15



## **Four Years of Hummingbird Breeding at ASDM, Continued**

copulation lasts less than five seconds. Both separate and fly back to their respective territories and groom themselves. All the copulations have occurred within the female's territory.

During one encounter I saw a male grab the feathers on the female's back with his feet. Somewhat burdened by her load the female did manage to fly. She soon landed on a perch with the male still attached to her back. He let go and copulation took place. This is the most forced copulation I have seen in the exhibit. On another occasion I saw a male displaying to a female who was brooding nestlings. After several unsuccessful attempts to run the male off, the female flew out and grabbed the male by the feathers on his head. They both fell to the ground with the female will holding the male's head. The female held the male's head to the ground with one foot and stood upright with the other foot. The male flopped around for several seconds and then the female released him. He did not come back to bother her again. Most copulations occur after the female has started to build a nest; in some cases the nest is complete. Sometimes the females copulate when they have no nest at all.

### **Eggs**

Several times it was observed that an egg was laid 48 hours after the copulation. It is quite possible a copulation took place the day before egg laying but I have never observed this. Female hummingbirds lay two white bean-sized eggs 48 hours apart. There seems to be no preference for the time of day when the eggs are laid. Eggs are laid during the morning or afternoon. One morning I watched a Costa's hummingbird lay her second egg. She left the nest to feed at which time I checked it to find one egg. She returned to the nest and sat in it as the birds usually do. She then lifted herself up and leaned over the edge of the nest. She rocked back and forth for three minutes and then settled back into the nest to incubate. She left the nest soon after to feed and the nest contained two eggs. When these birds incubate their eggs there is no rocking back and forth. They sit on their eggs without moving and occasionally turn in the nest. The behavior during the egg laying was very different. Sometimes a bird laid an egg in an inadequate nest and the egg fell out and broke. When this happened the bird usually did not lay a second egg. She would abandon the nest and try again elsewhere.

Incubation for both the Broad-billed and Costa's hummingbirds usually took 15 days. When an egg was laid late in the day or the female was off the nest more than usual, the egg did not hatch until the 16th day. The hummingbirds started incubating with the laying of the first egg. The females usually only left the nest to feed or chase away other birds. Some birds continued to work on their nests or decorate it after they had laid their eggs. If eggs did not hatch after 18 to 20 days they were pulled by the staff. The hummingbird usually laid again within a week or so. Some abandoned the nest and started a new one.

### **Nestlings and Fledglings**

Baby hummingbirds are helpless when they hatch and totally dependent upon their mothers for their survival. Their bodies resemble raisins with a huge head and eyes. The eyes are closed and do not open until the eighth day or later. They have tiny down feathers along the major feather tracts of the back. The feathers grown very fast and by the 11th or 12th day they cover most of the body. At this time the mothers usually stop brooding the nestlings since they can now regulate their own body temperature. The flight feathers are the last to develop. During hot weather mothers shaded the nests with their bodies and wings when the nestlings appeared hot.

Baby hummingbirds are fed regurgitated insects and nectar by the mothers. The females' long bill is inserted into the nestling's mouth and she thrusts the bill in and out. During the beginning when nestlings are very small the mother very gently feeds the young. As the young get larger the feeding is more vigorous. These mothers feed a lot of insects to their young at intervals of four to five times an hour. During the first two weeks after hatching, nestlings pop up in the nest when fed and sink back down afterwards. When the nestlings are almost three weeks old they spend more time higher up in the nest, and

## **Four Years of Hummingbird Breeding at ASDM, Continued**

several days before fledging they sit on the edge of the nest. They will try out their wings at this time. If the nest contained two nestlings and was crowded, these birds always fledged at an earlier age than those nests that only contained one bird.

Male Broad-billed nestlings always fledged before the females. The sex of these fledglings could be determined by the first or second day after fledging or sometimes while they were still in the nest. The males had color on their breasts and the females did not. Young hummingbirds fly very well when they first fledge. They stay close to the nest for the first few days but can fly as well as the adults soon afterwards. On several occasions we had fledglings return to their nests and fledge a second time. When hummingbirds fledge they have short bills and tails but these grow very fast. While in the nest they make no noise but after fledging they can be located by their begging "beep" calls. At two different times mothers were observed feeding young other than their own. Both of these Costa's had only one fledgling they were caring for. These mothers would feed their own young and then immediately feed another bird's baby that was close by and begging. No mothers were ever seen feeding a third fledgling if they had just fed their own two.

Youngsters were weaned as early as seven days after fledging (Table 1) if the mother hummingbirds were going to build a second nest and lay another clutch. Those birds that had laid a second clutch and were finished for the season continued to care for their young for up to 26 days. By this time these youngsters were feeding themselves at flowers and feeders long before their mother stopped feeding them. During the first few weeks or longer fledglings were usually not harassed by the other adult birds in the exhibit. These adults seemed to know that the fledglings posed no threat to their territories. Fledglings usually started feeding from flowers first and then graduated to feeders.

### **Conclusion**

I feel the breeding success at the Arizona-Sonora Desert Museum's Hummingbird Exhibit is the result of a number of factors. Outdoor aviaries represent a more natural and healthier environment for the species involved. They are also easier to maintain and service than indoor exhibits. All the species of hummingbirds in our aviary are commonly found in the Sonoran Desert region and these birds are accustomed to the weather extremes of this area. All but two of the ten species of hummingbirds in the exhibit breed in the wild within this area. The Broad-billed and Costa's hummingbirds are two of the species that breed in our area. They are also very aggressive birds and this may attribute to their willingness to breed readily within the hummingbird exhibit.

I think the most important factor contributing to the breeding success was the tremendous amount of planning and foresight initiated at the beginning of the hummingbird exhibit's creation. The exhibit design had to be one in which the care of the aviary could be implemented with as little disturbance to the birds as possible. The visitor path area is cleaned daily and the hummingbirds will stay in the planted area during this time (Fig. 1). The shape of the exhibit had to be such that the birds would feel comfortable enough to stake out individual territories and breed within these. The species and number of birds in the aviary were chosen carefully to enable these birds to coexist with one another and breed as well.

When the hummingbird exhibit first opened in October 1988, we all hoped there would be breeding but none of us believed it would happen so quickly. The future looks very good for continued breeding in this unique exhibit. This exhibit is an excellent example of how a carefully planned aviary can not only be a popular attraction at a zoological institution but a very successful breeding enclosure as well.

### **Acknowledgments**

Sidney F. Tyler made the hummingbird exhibit possible with his very generous donation. I am grateful to Peter Siminski (Curator), Paula Koeneman (Supervisor), and the keeper staff of the Mammalogy & Ornithology Department for being my eyes and ears in the exhibit when I could not be there. Special thanks to Charlene Wagner for computer help.



## **Four Years of Hummingbird Breeding at ASDM, Continued**

Peter Siminski should be highly commended for his important role in the designing of this excellent exhibit and the forethought he showed. I am also very grateful for the patience he shows at my endless ideas and suggestions about the hummingbird exhibit.

This paper was reviewed by Christine Sheppard, Curator of Birds at the Bronx Zoo, Bronx, NY and by Dr. Michael Wallace, Curator of Birds at the Los Angeles Zoo, Los Angeles, CA. This manuscript was first submitted to AKF on 20 July of 1992.

### **References**

- Johnsgard, P.A. 1983. *The Hummingbirds of North America*  
Smithsonian Institution Press, Washington, DC
- ISIS. 1989. ISIS Species Distribution Report Abstract.  
Apple Valley, MN, USA. pp. 311.
- ISIS. 1990. ISIS Species Distribution Report Abstract.  
Apple Valley, MN, USA. pp. 327.
- ISIS. 1991. ISIS Species Distribution Report Abstract.  
Apple Valley, MN, USA. pp. 383.
- Palmer, B., Krebs, K., and McLalan, S. 1989. *The Creation and Operation of a Native Hummingbird Exhibit*. Proceedings of the 15th National Conference of the AAZK. Syracuse, NY. pp. 22.

### **Product Cited**

Nektar-Plus®, a Nektan Product, D-7530 Pforzheim, West-Germany.



## *The Shape of Enrichment*

*The Shape of Enrichment* is a new publication focusing on environmental and behavioral enrichment for captive animals. This international open forum includes feature articles as well as regular columns on browse, feeding programs, behavior, and exhibit design and construction. The first issue was published in August, 1992.

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# Bungee Jumping Monkeys

By Beth Schwenk, Keeper  
Rare Animal House, Philadelphia Zoo  
Philadelphia, PA

The Philadelphia Zoological Gardens houses a group of 5.4 Spectacled langurs (*Presbytis obscurus*). The family consists of three adults and six offspring ranging in age from four years to five months. They are housed in a glass-fronted exhibit that is 15 x 10 x 10 feet. The walls and floor are tile, and bars are across the top of the exhibit. About five feet from the floor there is a metal bar crossing the length of the exhibit in the middle. Two small ledges are on the back wall. Their exhibit has always been decorated with a variety of ropes, swings and plastic toys. The ropes are hung in loops at the ceiling for added perching space. They are also hung vertically from the ceiling and from the lower cross bar. These vertical ropes are very popular with the juveniles during their play sessions.

A few months ago, we were able to expand their space to an adjacent exhibit. We hung the traditional ropes and decided to try something new, bungee cord. We used a cord size of 5/16 inch. We initially hung one piece approximately five feet from the floor. We put a small Kong Toy on the end of it for something to grab. This quickly proved a bad idea as the Kong Toy became a dangerous projectile when released at full stretch of the cord. We removed the toy and tied a knot at the end of the cord.

The first attempts at hanging on the bungee cord ended with the young langurs reaching the floor. They would release the rope and return to the crossbar to grab the end again. The first cord was becoming popular, and they were seen fighting over it, so we added a second piece of cord, hung the same way at the other side of the exhibit.

The three adults have never been seen on the bungee cord. The oldest offspring only uses it to aid himself in jumping to the floor from the crossbar. For the five younger offspring, the bungee is a favorite toy. They have become very creative with their "bungee games". They enjoy bouncing on it several times instead of releasing it to the floor. A favorite wrestling move is to have one animal on the ground and the other hanging upside-down by his/her feet on the end of the cord. They attack each other with each stretch of the cord. One of the langurs has become very fond of and quite good at vaulting. During the recoil (upswing) of the cord, she will release the cord and continue freely upward to the bars above her. The two youngest offspring do not weigh enough to cause the cord to stretch, but they enjoy trying. They are only successful if an older sibling joins them on the cord.

Up until now the exhibit was full of predictable toys. The bungee cord provides our langurs with new challenges and an opportunity to develop new skills and games for themselves.



## Publications Available

Worldwide, many zoos are committed to breeding and maintaining viable stocks of endangered animals so that captive-bred animals can be reintroduced to suitable habitat when it becomes available, or even to supplement diminishing wild stocks. Notable successful reintroductions include the Arabian oryx in Oman and the Golden lion tamarin in Brazil. These cases emphasize the importance of assuming responsibility for the welfare of the animals both before and after release and the monitoring of their survival. Relatively few reintroduction programs have been totally successful and the whole procedure of reintroducing animals into their natural habitat is still developing.

The Universities Federation for Animal Welfare has just published guidelines for reintroduction of captive-bred mammals to the wild. UFAW published these guidelines for the International Academy of Animal Welfare Sciences and they are intended to supplement the IUCN position statement on the translocation of living organisms: reintroductions and restocking. The reintroduction guidelines are available at £2.50/U.S\$6 (including postage and packing) from: Universities Federation for Animal Welfare, 8 Hamilton Close, South Mimms, Potters Bar, Herts, UK EN6 3QD.





# Book Review

## Lories and Lorikeets in Aviculture

By John Vanderhoof

Illustrated by Gamini Ratnavira

Loriidae Production Network, P.O. Box 575

Woodlake, CA 93286

99 pgs. Hardbound

Review by Gary A. Powell

Manager of Facilities & Development

Waimea Falls Park, Haleiwa, Hawaii

The iridescence of coloring combined with an almost Laurel and Hardy-like personality make members of the Loriidae family easy to enjoy and justify expense and effort involved. Loriidae are present in a large portion of the tropics, but it is primarily in Australia that much actual documentation has been produced. Several publications from Australia and England have dealt with this family and it is in the last year that a publication geared toward a somewhat less technical audience was produced by Mr. Vanderhoof in California.

Lories and Lorikeets in Aviculture was written by John Vanderhoof, who is a long-time breeder of exotic finches, lories and lorikeets as well as a popular lecturer on the subject of breeding and rearing various species of birds. The book is basically a limited review of 28 species of lories and lorikeets. After a brief but informative chapter on the natural history of the family (which actually gives more on the basic biological nature of the group than on their evolution), the covered species are described by name, synonym(s), geographical region of distribution, physical size, vocal characteristics, nesting habits, length of incubation, sex identification techniques, observed dietary preferences, and a personal comment as to their desirability as pets. The last portion of each listing gives general comments.

With the exception of the pet-quality listing, which undoubtedly raises questions of the validity of the book's commitment to conservation in Aviculture as opposed to the hobbyists' interests, the text is useful and quite practical. Mr. Vanderhoof prefaces the book with the statement "the purpose of this book is to help those interested in breeding and/or keeping exotic birds...the information practical and simple".

Unquestionably the most impressive feature of this book are the 30+ full-color plate illustrations by Gamini Ratnavira. Born in Sri Lanka, Mr. Ratnavira has become internationally known for his illustrations of exotic wildlife including a series of postage stamps for the Sri Lankan government. It is unfortunate that the four illustrations gracing the introductory pages of the publication are not identified. Perhaps subsequent editions will have this oversight corrected.

The last portion of the book covers a practical range of avicultural topics including accommodation, feeding, breeding, hand-rearing/feeding, health care (covering specifically feather disorders, digestive problems, [infectious and bacterial complaints as well as organism-caused disorders] and general conditions).

Although one cannot consider this work to be an exhaustive treatment of the family Loriidae, it is a fast and reasonably accurate reference for general information. Combined with more detailed works already available, Lories and Lorikeets in Aviculture, will serve well on the library of anyone dealing with lories and lorikeets. Mr. Vanderhoof may be applauded for his effort to present information to a broad range of readers in a straightforward and pleasant manner. His closing remarks encouraging breeders to consider hybridization anathema and promoting conservation and responsible international behavior lends him credibility in a group often considered negatively by those involved in public and private Professional Animal Care.



## Book Review, Continued

### **Cheyenne Bottoms: Wetlands in Jeopardy**

By John L. Zimmerman 1990

University Press of Kansas, 329 Carruth, Lawrence, KS 66045

152 pgs. Hardback \$19.95

*Review by Gretchen Ziegler  
Area Supervisor, Topeka Zoo  
Topeka, KS*

Americans unfamiliar with the state of Kansas might laugh at the idea that Kansas contains one of the most important ecosystems in the Northern Hemisphere. Some uninformed Kansans might laugh too, but it is true nonetheless. Cheyenne Bottoms is a 41,000 acre marshland located right in the middle of Kansas, which supports hundreds of thousands of shorebirds, waterfowl, cranes, and other birds during their spring and fall migrations. It is estimated that the Bottoms provides critical resting and feeding opportunities for at least 45% of the shorebirds migrating to the Arctic breeding grounds each spring. But tragically, this "jewel of the prairie" may be drying up permanently.

John Zimmerman, a professor of ornithology at Kansas State University, has written a book on this endangered wetland. Cheyenne Bottoms: Wetland in Jeopardy is a thorough description of the past, present, and possible future of the Bottoms, detailing its ecological complexity and significance as an internationally important wetland.

The first of the book's nine chapters provides a brief historical perspective of the region, beginning with the first written accounts from Coronado's expeditions, through the arrival of white settlers, to the onslaught of modern agriculture. Next is a prehistoric description of the creation of the Bottoms, beginning with the Paleozoic. Then Zimmerman explains how water - and the lack thereof - effects all aspects of the marsh, and identifies all the water sources of Cheyenne Bottoms, many of which have been depleted.

The three middle chapters highlight the ecology of this vastly intricate ecosystem. First the reader follows the flow of energy within the marsh up and down the food chain, and becomes quite familiar with the significant species in each level of the chain. The next chapter explores the six individual ecological communities one can find within and around the Bottoms, composed of specific varieties of plants and the animal life they support. Shorebird migration patterns, and how they relate to and depend upon the resources found at the Bottoms, are discussed in another chapter. Zimmerman not only includes explanations of the general biological principles at work in the marsh, but connects these with very specific examples of how individual species put these principles to use.

After thoroughly describing all the components that make up Cheyenne Bottoms, the author moves on to explain the problems which face it. While discussing these issues in detail, he also simplified them into one basic dilemma: an increasing lack of water. There are obviously many factors involved, some even natural. However, it is pointed out that some of our most serious environmental crises, such as global warming and irresponsible agricultural practices, could mean the doom of the wetland ecosystem as well as the rest of our environment. Chapter eight convinces readers of the importance of Cheyenne Bottoms, not only as the most frequented stopover of migrating birds in the middle of the continent, but also as an economic and recreational resource utilized by sportsmen and birdwatchers from around the world. The last chapter ends the book with some optimism, examining the methods used today to conserve water at the Bottoms, and looking at the long-term management plan which will tackle problems on a number of fronts. Lastly, Zimmerman turns the reader's attention to the much broader environmental problems that threaten the Bottoms and all of us.

This book also includes an extensive bibliography divided by chapter, and five appendices of every vascular plant, fish, amphibian/reptile, bird, and mammal found at Cheyenne Bottoms, organized by family. The book's appeal is enhanced by eight pages of color wildlife photographs and several dozen interesting and detailed drawings scattered throughout the text.



## Book Review, Continued

Although the book deals exclusively with one specific wetland, the creative style of writing and the author's broader implications about environmental issues should appeal to the general-interest reader as well. Zimmerman's use of humorous personal anecdotes also make for very enjoyable reading. His observations of our responsibility towards this planet serve as important reminders for us all. Cheyenne Bottoms: Wetlands In Jeopardy is a good addition to any zoo or personal library.

### Biology of the Koala

Edited by A.K. Lee, K.A. Handasyde, and G.D. Sanson  
Surrey, Beatty & Sons Pty. Ltd. 1990  
43 Rickard Rd., Chipping Norton, NSW 2170, Australia  
336 pgs. Hardback (No U.S. price given)

*Review by Lois Johannes, Animal Keeper  
Los Angeles Zoo, Los Angeles, CA*

Biology of the Koala is a collection of 31 papers from the third national symposium, sponsored by the World Koala Research Corporation, which was held in February 1988. For a technical book, the topics are very comprehensive. There are several papers on each subject. Examples include population dynamics, social behaviors, digestion, nutrition, reproduction, and chlamydial diseases.

A lot of known knowledge of koalas has been reassessed in this book. Even if you have exhibited koalas for some time, you will find a lot of new information. For those without knowledge of koala management, the book will be a great help.

Many of the papers presented in the book were very interesting, and at times, I found it was difficult to put the book down. The book is an excellent reference source, and can be consulted when specific information is needed. It should be useful not only for keepers, but for curators and veterinarians as well. The casual reader can also get a wealth of basic information on koalas from this text.

I would recommend this book to any institution currently exhibiting koalas. Any zoo planning a koala exhibit in the future would also do well to obtain a copy.



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## Gorilla Escapes in Chinese Zoo

On 2 November the Associated Press out of Beijing reported that a 13-year-old male gorilla, Qing Qing, had escaped from a zoo in the northern city of Shijiazhuang. The animal apparently escaped its cage during feeding time and was at large in the city for an hour before he was recaptured.

Following his escape from the monkey house, Qing Qing grabbed a visitor who attempted to get away by hitting and kicking the gorilla. Qing Qing consequently bit the man, taking off the tip of his nose, his upper lip and ripping his cheeks. The man also lost two finger tips.

AP reported that as frightened zoo visitors fled the area, Qing Qing scaled a wall surrounding the zoo and began walking down a main road. With the police giving chase, Qing Qing ran through the streets and climbed onto the roof of a one-story school compound building. He later entered a classroom building where police trapped him in a second floor hall and injected him with tranquilizers.



# **L.I.N.K.**

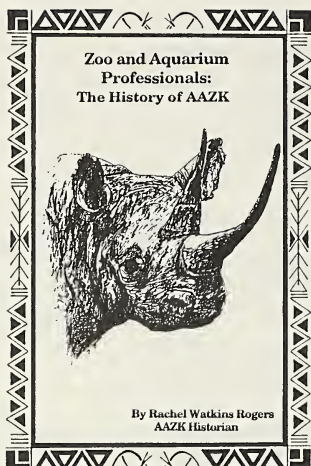
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Coordinator for the LINK System: Mark de Denus, Assiniboine Park Zoo, 2355 Corydon Ave., Winnipeg, Manitoba, Canada R3P 0R5. (204) 837-2916 [h].

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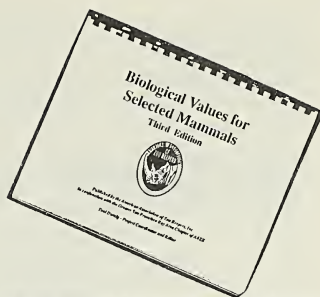
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## ***Sarajevo Zoo Loses Last Animal Resident***

The ongoing battle for domination in the Yugoslav city of Sarajevo has claimed the life of the last animal in the Sarajevo Zoo. The animal, a brown bear, died of starvation despite the efforts of zoo worker Pal Takac and others who brought bread and an apple to the animal but found him too weak to eat.

The bear was able to survive longer than any of the other zoo residents by eating the other two bears which shared his cage. The Bosnian capital has been under seige for over seven months and the animal's cage was a mere 100 meters from the lines of Sarajevo's Serbian troops and was regularly exposed to sniper and mortar fire.



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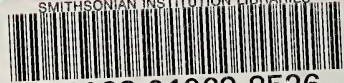








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